

SEARCH REQUEST FORM

Scientific and Technical Information Center

Requester's Full Name: Leslie Wong Examiner #: 68866 Date: 6/27/03
Art Unit: 1761 Phone Number 308-1979 Serial Number: 09/677780
Mail Box and Bldg/Room Location: CP3-5E06 Results Format Preferred (circle): PAPER DISK E-MAIL

If more than one search is submitted, please prioritize searches in order of need.

Please provide a detailed statement of the search topic, and describe as specifically as possible the subject matter to be searched. Include the elected species or structures, keywords, synonyms, acronyms, and registry numbers, and combine with the concept or utility of the invention. Define any terms that may have a special meaning. Give examples or relevant citations, authors, etc, if known. Please attach a copy of the cover sheet, pertinent claims, and abstract.

27

Title of Invention: _____

Inventors (please provide full names): Fitz et al (sorry I'm on my way out and I didn't bring the info)

Earliest Priority Filing Date: _____

For Sequence Searches Only Please include all pertinent information (parent, child, divisional, or issued patent numbers) along with the appropriate serial number.

U-CH₂-S-T

where U and T are described in claim 1. I have the backbone of -CH₂-S-

I will be on vacation until July 9th so there is no hurry.

STAFF USE ONLY

Searcher: Ed

Searcher Phone #: _____

Searcher Location: _____

Date Searcher Picked Up: _____

Date Completed: 6-27-03Searcher Prep & Review Time: 15

Clerical Prep Time: _____

Online Time: 135

Type of Search

NA Sequence (#) _____

AA Sequence (#) _____

Structure (#) _____

Bibliographic _____

Litigation _____

Fulltext _____

Patent Family _____

Other _____

Vendors and cost where applicable

STN \$ 324.93

Dialog _____

Questel/Orbit _____

DyLink _____

Lexis/Nexis _____

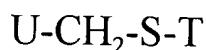
Sequence Systems _____

WWW/Internet _____

Other (specify) _____

IN THE CLAIMS:

42 Claim 1 (currently amended): A meat flavoured foodstuff comprising an effective flavour-imparting or flavour-reinforcing amount of (a) at least one compound with a (hydrogenated) 2-methyl-3-furyl-thio moiety and a hydrogen atom, an -S-CH₃ group, an -CO-CH₃ group or a 2-methyl-3-furyl-thio moiety and an effective amount of (b) at least one compound having the structure



in which C, H and S have the conventional meanings of carbon, hydrogen and sulphur atoms respectively, U represents a thiol group, a lower thioacyl group, a lower thioalkyl group, a hydroxyl group or a 2-methyl-3-furyldithio group and T represents a hydrogen atom, a lower acyl group or a 2-methyl-3-furyl-thio group or a -S-CH₂-U group as defined above.

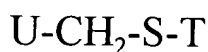
Claim 2 (currently amended): A meat flavoured foodstuff according to claim 1, in which wherein lower thioacyl- and lower acyl group means that these groups comprise from 2 to 6, preferably 2 or 3 carbon atoms.

Claim 3 (currently amended): A meat flavoured foodstuff according to claim 1 or 2, in which wherein U represents a lower thioacyl group and T represents a lower acyl group.

Claim 4 (currently amended): A meat flavoured foodstuff according to a preceding claim 1 or 2, wherein in which lower thioacyl group means thioacetoxy and lower acyl group independently means acetyl.

Claim 5 (original): A process for imparting a savoury flavour to a foodstuff comprising incorporating in said foodstuff an effective amount of at least one compound with

a (hydrogenated) 2-methyl-3-furyl-thio moiety and a hydrogen atom, an -S-CH₃ group, an -CO-CH₃ group or a 2-methyl-3-furyl- moiety and an effective amount of at least one compound having the structure



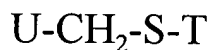
in which C, H and S have the conventional meanings of carbon, hydrogen and sulphur atoms respectively, U represents a thiol group, a lower thioacyl group, a lower thioalkyl group, a hydroxyl group or a 2-methyl-3-furyldithio group and T represents a hydrogen atom, a lower acyl group or a 2-methyl-3-furyl-thio group or a -S-CH₂-U group as defined above.

Claim 6 (currently amended): A process to claim 5, in which lower thioacyl-, lower alkyl- and lower acyl group means that these groups comprise from 2 to 6, preferably 2 or 3 carbon atoms.

A-2
Claim 7 (original): A process according to claim 5 or 6 in which U represents a lower thioacyl group or a lower acyloxy group and T represents a lower acyl group.

112(4)

Claim 8 (original): A flavouring composition for foodstuffs comprising at least one compound comprising a (hydrogenated) 2-methyl-3-furyl-thio moiety and a hydrogen atom, an -S-CH₃ group, an -CO-CH₃ group or a 2-methyl-3-furyl-thio moiety and at least one compound having the structure



in which C, H and S have the conventional meanings of carbon, hydrogen and sulphur atoms respectively, U represents a thiol group, a lower thioacyl group, a hydroxyl group or a 2-methyl-3-furyldithio group and T represents a hydrogen atom, a lower acyl group or a lower acyl group.

Claim 9 (currently amended): A composition according to claim 8, in which lower thioacyl-, lower alkyl- and lower acyl group means that these groups comprise from 2 to 6; preferably 2 or 3 carbon atoms.

Claim 10 (currently amended): ~~The use of both an effective~~ A foodstuff having a meat flavor, said flavor having been imparted by incorporating therein

an amount of at least one compound with a (hydrogenated) 2-methyl-3-furyl-thio moiety and a hydrogen atom, an -S-CH₃ group, an -CO-CH₃ group or a (hydrogenated) 2-methyl-3-furyl-thio group and, ~~an effective~~ amount of at least one compound having the structure



in which C, H and S have the conventional meanings of carbon, hydrogen and sulphur atoms respectively, U represents a thiol group, a lower thioacyl group, a lower thioalkyl group, a hydroxyl group or a (hydrogenated) 2-methyl-3-furyldithio group and T represents a hydrogen atom, a lower acyl group or a (hydrogenated) 2-methyl-3-furyl-thio group or a -S-CH₂-U group as defined above, sufficient to impart said meat flavor.

Claim 11 (currently amended): A process for preparing a pure compound with at least one free thiol group as defined in claim 1 by ~~hydrolysing~~ hydrolyzing the corresponding thioacyl compound in the presence of an enzyme or a cation exchange resin.

Claim 12 (original): A process according to claim 11, in which the enzyme is a lipase.

Claim 13 (new): A meat flavored foodstuff according to claim 2, wherein said lower thioacyl- and lower acyl group comprise 2 or 3 carbon atoms.

Claim 14 (new): A meat flavored foodstuff according to claim 3, wherein lower thioacyl group means thioacetoxy and lower acyl group independently means acetyl.

Claim 15 (new): A meat flavored foodstuff according to claim 1, wherein flavor-imparting or flavor-reinforcing amount is from 0.01 to 1000 ppb on a weight basis.

A2
Claim 16 (new): A meat flavored foodstuff according to claim 1, wherein U represents a 2-methyl-3-furyldithio group.

Claim 17 (new): A meat flavored foodstuff according to claim 1, wherein T represents a 2-methyl-3-furyl thio group.

=> file reg

FILE 'REGISTRY' ENTERED AT 14:19:17 ON 27 JUN 2003
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=> display history full l1-

FILE 'HCAPLUS' ENTERED AT 12:44:11 ON 27 JUN 2003

L1 741 SEA FITZ ?/AU
L2 261 SEA VAN DELFT ?/AU OR VANDELFT ?/AU OR DELFT ?/AU
L3 124 SEA KERLER ?/AU
L4 150 SEA HESP ?/AU
L5 63 SEA APELDOORN ?/AU OR APPELDOORN ?/AU OR APELLDOORN ?/AU
OR APPELLDOORN ?/AU
L6 83 SEA ALTENA ?/AU
L7 1 SEA L1 AND L2 AND L3 AND L4 AND L5 AND L6
SEL L7 1 RN

FILE 'REGISTRY' ENTERED AT 12:44:40 ON 27 JUN 2003

L8 28 SEA (10387-40-3/BI OR 104-76-7/BI OR 111-27-3/BI OR
L9 12 SEA L8 AND S/ELS
D L9 1-12 IDE
SEL L9 2,3,4,5,6,11 RN
L10 6 SEA (2506-35-6/BI OR 28588-75-2/BI OR 29414-47-9/BI OR
333384-99-9/BI OR 38634-59-2/BI OR 85544-38-3/BI)

FILE 'HCA' ENTERED AT 12:55:39 ON 27 JUN 2003

L11 133 SEA L10
L12 174353 SEA MEAT? OR BEEF? OR VEAL? OR PORK? OR CHICKEN? OR
POULTRY OR POULTRIES OR TURKEY# OR VENISON?
L13 108112 SEA SEASONED OR SEASONING# OR FLAVOR? OR FLAVOUR? OR
TASTE# OR TASTY OR TASTING# OR ORGANOLEP? OR SPICE# OR
SPICING# OR SPICY OR PALAT?
L14 181521 SEA (FLAVOR? OR FLAVOUR? OR SAVOR? OR SAVOUR? OR SAPID?
OR SAPOR? OR TAST? OR PALAT? OR GUSTAT? OR TOOTHsome? OR
DELECTAB? OR SEASON? OR SPICE? OR APPETIZ?)/BI,AB
L15 130301 SEA (FRAGRAN? OR PERFUM? OR PARFUM? OR COLOGNE? OR ODOR?
OR AROMA# OR SMELL? OR SCENT? OR OLFACT? OR REDOLENT? OR
ESSENCE? OR BOUQUET? OR AMBROS?)/BI,AB
L16 57 SEA L11 AND L12
L17 71 SEA L11 AND (L13 OR L14)
L18 77 SEA L11 AND L15
L19 47 SEA L11 AND L12 AND (L13 OR L14)
D L19 10-15 HITRN

FILE 'REGISTRY' ENTERED AT 13:15:39 ON 27 JUN 2003

L20 1 SEA 28588-75-2

L21 5 SEA L10 NOT L20

FILE 'HCA' ENTERED AT 13:15:58 ON 27 JUN 2003

L22 80 SEA L20
L23 56 SEA L21
L24 46 SEA L22 AND L12 AND (L13 OR L14)
L25 55 SEA L22 AND L12 AND (L13 OR L14 OR L15)
L26 3 SEA L23 AND L12 AND (L13 OR L14 OR L15)
L27 4 SEA L23 AND L12
L28 15 SEA L23 AND (L13 OR L14)
L29 13 SEA L23 AND L15
L30 297773 SEA FOOD? OR BEVERAG?
L31 4 SEA L28 AND L30
L32 3 SEA L29 AND L30

FILE 'LREGISTRY' ENTERED AT 13:19:20 ON 27 JUN 2003

L33 STR

FILE 'REGISTRY' ENTERED AT 13:44:36 ON 27 JUN 2003

L34 0 SEA SSS SAM L33
L35 SCR 1538 AND 1363
L36 0 SEA SSS SAM L33 AND L35
L37 STR

FILE 'LREGISTRY' ENTERED AT 13:57:41 ON 27 JUN 2003

L38 STR L33

FILE 'REGISTRY' ENTERED AT 13:58:43 ON 27 JUN 2003

L39 50 SEA SSS SAM L37 AND L35
L40 10215 SEA SSS FUL L37 AND L35
SAV L40 WON780/A
L41 0 SEA SUB=L40 SSS SAM L38
L42 40 SEA SUB=L40 SSS FUL L38
SAV L42 WON780A/A

FILE 'HCA' ENTERED AT 14:03:19 ON 27 JUN 2003

L43 202 SEA L42
L44 9894 SEA L40
L45 6 SEA L43 AND L12
L46 5 SEA L45 AND (L13 OR L14 OR L15)
L47 21 SEA L43 AND (L13 OR L14)
L48 4 SEA L47 AND L30
L49 23 SEA L43 AND L15
L50 7 SEA L49 AND (L12 OR L30)
L51 23 SEA L43 AND 17/SC, SX
L52 21 SEA L51 AND (L13 OR L14 OR L15)
L53 18 SEA L51 AND (L13 OR L14)
L54 150 SEA L44 AND L12
L55 26 SEA L54 AND (L13 OR L14)
L56 33 SEA L54 AND (L13 OR L14 OR L15)
L57 9 SEA L26 OR L27 OR L31 OR L32 OR L46 OR L48 OR L50
L58 13 SEA L52 NOT L57

L59 28 SEA L56 NOT (L57 OR L58)

=> d 142 que stat

L35 SCR 1538 AND 1363

L37 STR

G1—CH2—S S@5

1 2 3

VAR G1=O/5

NODE ATTRIBUTES:

CONNECT IS X2 RC AT 3

CONNECT IS X2 RC AT 5

DEFAULT MLEVEL IS ATOM

DEFAULT ECLEVEL IS LIMITED

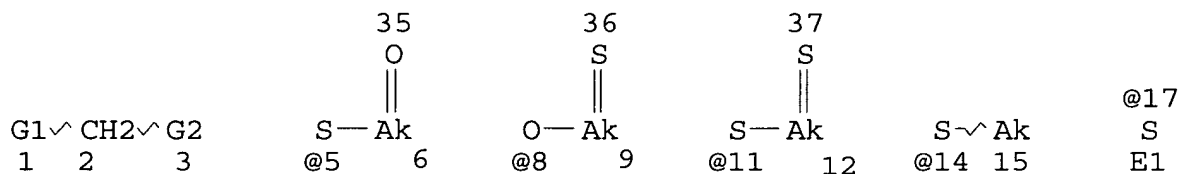
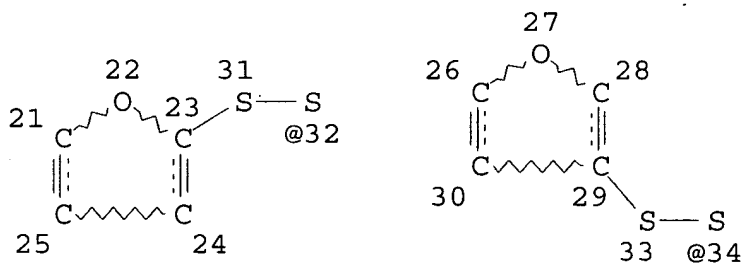
GRAPH ATTRIBUTES:

RING(S) ARE ISOLATED OR EMBEDDED

NUMBER OF NODES IS 4

STEREO ATTRIBUTES: NONE

L38 STR



Page 1-A

S—S—CH2~G1
@19 20 38 39

Page 1-B

VAR G1=17/5/8/11/14/32/34/OH

VAR G2=17/5/32/34/19

NODE ATTRIBUTES:

HCOUNT IS E1 AT 17

CONNECT IS E2 RC AT 6
CONNECT IS E2 RC AT 9
CONNECT IS E2 RC AT 12
CONNECT IS E1 RC AT 15
CONNECT IS E1 RC AT 17
CONNECT IS E2 RC AT 19
CONNECT IS E2 RC AT 20
CONNECT IS E2 RC AT 31
CONNECT IS E2 RC AT 32
CONNECT IS E2 RC AT 33
CONNECT IS E2 RC AT 34
DEFAULT MLEVEL IS ATOM
DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:

RING(S) ARE ISOLATED OR EMBEDDED
NUMBER OF NODES IS 33

STEREO ATTRIBUTES: NONE

L40 10215 SEA FILE=REGISTRY SSS FUL L37 AND L35
L42 40 SEA FILE=REGISTRY SUB=L40 SSS FUL L38

100.0% PROCESSED 10215 ITERATIONS
SEARCH TIME: 00.00.01

40 ANSWERS

=> file hca

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L57 ANSWER 1 OF 9 HCA COPYRIGHT 2003 ACS

136:324259 Headspace **aroma** of "wild onion" trees. Yang, Xiaogen; Josephson, Dave; Peppet, Jeff; Eilerman, Robert; Grab, Willi; Gassenmeier, Klaus (Givaudan Flavors Corp., Cincinnati, OH, 45216, USA). Special Publication - Royal Society of Chemistry, 274(Food Flavors and Chemistry), 266-273 (English) 2001. CODEN: SROCDO. ISSN: 0260-6291. Publisher: Royal Society of Chemistry.

AB In the Gabonese rain forest, there are at least 4 types of trees whose bark have strong garlic-like or onion-like **odor**. They are often called "wild onion trees". These trees were identified as *Afrostryax kamerunensis* Huac., *Scorodophloeus zenkerei* Huac., *Hua gabonii* Huac., and *Afrostryax lepidophylleus* Huac. The bark of the trees are used for cooking. The leaves and seeds of *H. gabonii* and *A. lepidophylleus*, and the roots from young trees of *A. kamerunensis* are also used in **flavoring** sauces. In addn., the bark also are used for medicinal purposes. The volatile

components of freshly cut bark of 3 species: *A. kamerunensis*, *S. zenkere*, *H. gabonii* were collected and analyzed. Many sulfur-contg. compds. were present in the headspace. The character impact compds. were identified as di-Me disulfide, 2,3,5-trithiahexane, 2,4,6-trithiaheptane, and 2,4-dithiapentane by GC sniffing.

IT 38634-59-2, Methylthiomethyl acetyl sulfide
85544-38-3, 2,4,5,7-Tetrathiaoctane
(headspace **aroma** of wild onion trees)
RN 38634-59-2 HCA
CN Ethanethioic acid, S-[(methylthio)methyl] ester (9CI) (CA INDEX NAME)

AcS-CH₂-SMe

RN 85544-38-3 HCA
CN Disulfide, bis[(methylthio)methyl] (9CI) (CA INDEX NAME)

MeS-CH₂-S-S-CH₂-SMe

CC 17-1 (Food and Feed Chemistry)
Section cross-reference(s): 62
ST headspace **aroma** wild onion tree
IT *Afrostryax kamerunensis*
Food analysis
Gas chromatography
Hua gabonii
Odor and Odorous substances
Scorodophloeus zenkeri
(headspace **aroma** of "wild onion" trees)
IT Tree
(wild onion; headspace **aroma** of "wild onion" trees)
IT 819-75-0 2949-92-0 4732-12-1 13474-59-4 18252-46-5
68758-68-9 81531-39-7, 1,2,4,5,7-Pentathiocane 103439-78-7
415686-98-5
(headspace **aroma** of "wild onion" trees)
IT 60-12-8, Phenylethyl alcohol 64-17-5, Ethanol, biological studies
64-19-7, Acetic acid, biological studies 65-85-0, Benzoic acid,
biological studies 66-25-1, n-Hexanal 67-68-5, Dimethyl
sulfoxide, biological studies 67-71-0, Dimethyl sulfone 68-11-1,
Mercaptoacetic acid, biological studies 71-36-3, Butan-1-ol,
biological studies 71-41-0, Amyl alcohol, biological studies
74-93-1, Methanethiol, biological studies 78-93-3, Methyl ethyl
ketone, biological studies 80-56-8, .alpha.-Pinene 87-20-7,
Iso-Amyl salicylate 87-44-5, .beta.-Caryophyllene 88-84-6,
.beta.-Guaiene 91-57-6, 2-Methylnaphthalene 95-16-9,
Benzothiazole 98-01-1, Furfural, biological studies 98-86-2,
Acetophenone, biological studies 99-85-4, .gamma.-Terpinene
99-87-6, p-Cymene 100-47-0, Benzonitrile, biological studies
100-51-6, Benzyl alcohol, biological studies 100-52-7,
Benzaldehyde, biological studies 100-66-3, Anisole, biological

studies 104-76-7, 2-Ethylhexan-1-ol 106-21-8,
3,7-Dimethyl-1-octanol 106-68-3, 3-Octanone 107-89-1,
3-Hydroxybutanal 107-92-6, n-Butyric acid, biological studies
107-93-7, trans-2-Butenoic acid 108-95-2, Phenol, biological
studies 110-93-0, 6-Methylhept-5-en-2-one 111-27-3, 1-Hexanol,
biological studies 111-71-7, Heptanal 112-05-0, Nonanoic acid
112-32-3, n-Octyl formate 112-88-9, 1-Octadecene 112-92-5,
Octadecanol 118-56-9, Homomenthyl salicylate 118-60-5,
2-Ethylhexyl salicylate 119-61-9, Benzophenone, biological studies
122-00-9, p-Methylacetophenone 122-78-1, Phenyl acetaldehyde
123-35-3, Myrcene 123-42-2, 4-Hydroxy-4-methyl-2-pentanone
123-51-3, Iso-Amyl alcohol 123-72-8, Butanal 124-07-2, Octanoic
acid, biological studies 124-13-0, Octanal 124-19-6, Nonanal
126-33-0, Tetrahydrothiophene, 1,1,dioxide 127-91-3, .beta.-Pinene
128-37-0, Ionol, biological studies 137-32-6, 2-Methylbutan-1-ol
138-86-3, Limonene 142-62-1, Caproic acid, biological studies
142-91-6, Isopropyl palmitate 149-57-5, 2-Ethylhexanoic acid
289-16-7, 1,2,4-Trithiolane 291-22-5, 1,2,4,5-Tetrathiane
292-45-5, 1,2,4,6-Tetrathiepane 470-82-6, 1,8-Cineole 473-13-2,
.alpha.-Selinene 483-76-1, .delta.-Cadinene 483-78-3, Cadalene
502-61-4, Farnesene 506-42-3, trans-9-Octadecen-1-ol 512-61-8,
Santalene 513-86-0, Acetoin 514-51-2, .beta.-Patchoulene
536-74-3, Phenylacetylene 541-85-5, 5-Methyl-3-heptanone
555-10-2, .beta.-Phellandrene 579-07-7, 1-Phenyl-1,2-propanedione
582-24-1, .alpha.-Hydroxyacetophenone 586-62-9, Terpinolene
589-82-2, 3-Heptanol 589-98-0, Octan-3-ol 616-25-1,
Pent-1-en-3-ol 617-94-7, .alpha.,.alpha.-Dimethylbenzenemethanol
623-36-9 624-92-0, Dimethyl disulfide 625-28-5, 3-Methyl
butanenitrile 644-30-4, .alpha.-Curcumen 732-26-3,
Tri-tert-butyl phenol 926-37-4, 4,4-Dimethylpent-2-enal
928-96-1, cis-Hex-3-en-1-ol 930-60-9, 2-Cyclopentene-1,4-dione
933-48-2, Trixanol 1454-85-9, 1-Heptadecanol 1576-95-0,
cis-2-Pentenol 1618-26-4, 2,4-Dithiapentane 1620-98-0,
3,5-Di-tert-butyl-4-hydroxybenzaldehyde 1741-83-9, 2-Thiaheptane
1795-15-9, Octylcyclohexane 1879-07-8, cis-p-Menth-8-ene
1879-09-0, 6-tert-Butyl-2,4-dimethyl phenol 2277-20-5, 6-Nonenal,
(E)- 2314-48-9, Carbonotrithioic acid dimethyl ester 2436-90-0,
Citronellene 3338-55-4, cis-.beta.-Ocimene 3387-41-5, Sabinene
3391-86-4, 1-Octen-3-ol 3491-57-4 3592-19-6 3658-80-8,
Dimethyl trisulfide 3777-69-3, 2-Pentylfuran 3913-02-8, 2-Butyl
octanol 4130-42-1, 2,6-Bis(1,1-dimethylethyl)-4-ethylphenol
4170-30-3, 2-Butenal 4312-99-6, 1-Octen-3-one 4630-07-3,
Valencene 4829-04-3, 1,3-Dithiolane 5008-72-0 5418-86-0
6540-86-9, 2,4,6-Trithiaheptane 6617-49-8 6728-26-3,
trans-Hex-2-en-1-al 6753-98-6, Humulene 6938-51-8,
2-Octylbenzoate 10522-26-6, 2-Methyl-1-undecanol 13877-93-5
15193-25-6, o-Menth-8-ene 16225-26-6, 3,5-Di-tert-butylbenzoic
acid 16630-52-7, 3-Methylthiobutanal 17066-67-0, .beta.-Selinene
17283-81-7, Dihydro .beta.-ionone 17699-14-8, .alpha.-Cubebene
18794-84-8, Trans-.beta.-Farnesene 19780-25-7, 2-Ethyl-2-butenal
20068-02-4 23986-74-5, Germacrene D 27070-58-2, Octadecene
27251-68-9, Pentadecene 27625-35-0, 3-Methylbutyl 2-methylbutyrate

33577-16-1 38514-13-5, 3-Ethyl-4-methyl-1-pentanol
38634-59-2, Methylthiomethyl acetyl sulfide 42474-44-2,
2,3,5-Trithiahexane 51154-96-2, Massoialactone 58809-73-7,
2-Methylthiopropionic acid 66537-39-1 66537-40-4 80466-34-8,
2,4-Hexadienal 85544-38-3, 2,4,5,7-Tetrathiaoctane
103240-92-2 117210-66-9 119117-00-9 415686-96-3 415687-00-2
(headspace **aroma** of wild onion trees)

L57 ANSWER 2 OF 9 HCA COPYRIGHT 2003 ACS *imposed*

134:279946 **Savoury flavour** comprising 2-methyl-furan
-3-thiol and/or a derivative and methylenedithiol and/or a
derivative. Fitz, Wolfgang; Van Delft, Andries; Kerler, Josef;
Hesp, Theodorus Gerardus Maria; Apeldoorn, Willem; Altena, Gerrit
Hendrik (Quest International B.V., Neth.). Eur. Pat. Appl. EP
1090557 A1 20010411, 14 pp. DESIGNATED STATES: R: AT, BE, CH, DE,
DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI,
RO. (English). CODEN: EPXXDW. APPLICATION: EP 1999-203197
19990930.

AB A **food flavoring** material comprises
(hydrogenated) 2-methylfuran-3-thiol and methanedithiol and/or their
derivs. The combination of the above compds. leads to strong
food flavor reminiscent of **beef** broth.

IT 6725-64-0P, Methanedithiol
(**savory flavor** comprising 2-methylfuran
-3-thiol and methylenedithiol and/or derivs.)

RN 6725-64-0 HCA

CN Methanedithiol (6CI, 7CI, 8CI, 9CI) (CA INDEX NAME)

HS-CH₂-SH

IT 2506-35-6P, Methanedithiol diacetate 29414-47-9P,
Methylthiomethanethiol 38634-59-2P
(**savory flavor** comprising 2-methylfuran
-3-thiol and methylenedithiol and/or derivs.)

RN 2506-35-6 HCA

CN Ethanethioic acid, S,S'-methylene ester (9CI) (CA INDEX NAME)

AcS-CH₂-SAC

RN 29414-47-9 HCA

CN Methanethiol, (methylthio)- (6CI, 7CI, 8CI, 9CI) (CA INDEX NAME)

HS-CH₂-S-CH₃

RN 38634-59-2 HCA

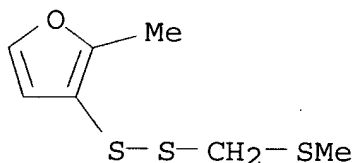
CN Ethanethioic acid, S-[(methylthio)methyl] ester (9CI) (CA INDEX NAME)

AcS-CH₂-SMe

IT 85544-38-3P 333384-99-9P
 (savory flavor comprising 2-methylfuran
 -3-thiol and methylenedithiol and/or derivs.)
 RN 85544-38-3 HCA
 CN Disulfide, bis[(methylthio)methyl] (9CI) (CA INDEX NAME)

MeS-CH₂-S-S-CH₂-SMe

RN 333384-99-9 HCA
 CN Furan, 2-methyl-3-[[methylthio)methyl]dithio]- (9CI) (CA INDEX NAME)



IC ICM A23L001-226
 ICS C07C319-02
 CC 17-6 (Food and Feed Chemistry)
 ST **flavoring** material methylfuranthiol methylenedithiol;
 furanthiol methylenethiol **flavoring** material; thiol
 methylene methylfuran **flavoring** material
 IT **Flavoring** materials
 (savory flavor comprising 2-methylfuran
 -3-thiol and methylenedithiol and/or derivs.)
 IT 18829-55-5, trans-2-Heptenal
 (savory flavor comprising 2-methyl-furan
 -3-thiol and methylenedithiol and/or derivs.)
 IT 64-17-5, Ethanol, biological studies 66-25-1, Hexanal 104-76-7,
 2-Ethyl-1-hexanol 111-27-3, 1-Hexanol, biological studies
 124-19-6, Nonanal 710-04-3, .delta.-Undecalactone 2548-87-0,
 trans-2-Octenal 3391-86-4, 1-Octen-3-ol 3913-81-3,
 trans-2-Decenal 4313-03-5, trans,trans-2,4-Heptadienal
 5910-87-2, trans,trans-2,4-Nonadienal 9001-62-1, Lipase
 18829-56-6, trans-2-Nonenal 25152-84-5, trans,trans-2,4-Decadienal
 333385-00-5
 (savory flavor comprising 2-methylfuran
 -3-thiol and methylenedithiol and/or derivs.)
 IT 6725-64-0P, Methanedithiol 28588-74-1P,
 2-Methylfuran-3-thiol
 (savory flavor comprising 2-methylfuran
 -3-thiol and methylenedithiol and/or derivs.)
 IT 75-11-6, Diiodomethane 2373-51-5, Chloromethylmethylsulfide
 10387-40-3, Potassium thioacetate 27610-45-3, Sodium sulfide

hydrate

- (savory flavor comprising 2-methylfuran
-3-thiol and methylenedithiol and/or derivs.)
- IT 2506-35-6P, Methanedithiol diacetate 29414-47-9P,
Methylthiomethanethiol 38634-59-2P
(savory flavor comprising 2-methylfuran
-3-thiol and methylenedithiol and/or derivs.)
- IT 28588-75-2P 85544-38-3P 333384-99-9P
(savory flavor comprising 2-methylfuran
-3-thiol and methylenedithiol and/or derivs.)

L57 ANSWER 3 OF 9 HCA COPYRIGHT 2003 ACS

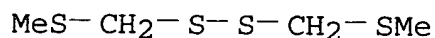
- 133:16558 Retention of sulfur **flavors** by **food** matrix
and determination of sensorial data independent of the medium
composition. Gijs, Laurence; Piraprez, Genevieve; Perpete,
Philippe; Spinnler, Eric; Collin, Sonia (Unite de Brasserie et des
Industries Alimentaires, Faculte des Sciences Agronomiques,
Universite catholique de Louvain, Louvain-la-Neuve, B-1348, Belg.).
Food Chemistry, 69(3), 319-330 (English) 2000. CODEN: FOCHDJ.
ISSN: 0308-8146. Publisher: Elsevier Science Ltd..
- AB Interactions between **food** matrix and sulfur compds.
(thioesters, sulfides, disulfides, pentanethiol and
2-ethoxythiazole) were studied in a real **food** system
composed of fresh cheese, triolein or inulin, and water. Results
obtained with the lipidic medium confirm that 10% of triolein is
enough to significantly affect **flavor** perception. The
lipophilicity index, log kw, appears as an interesting physicochem.
property allowing assessment of the **aroma** retention
intensity. Results obtained with inulin indicate how different the
retention will be when a polysaccharide is used as a fat-mimic.
Formulation of dietetic products has to take that discrepancy into
account. GC-**odor** port evaluation of dild. solns. appears
as an interesting method for easy acquisition of best estd. GC-lower
amts. detected by sniffing (BE-GC-LOADS), threshold values
independent of the medium compn.
- IT 85544-38-3
(retention of sulfur **flavors** by **food** matrix
and detn. of sensorial data independent of medium compn.)
- RN 85544-38-3 HCA
- CN Disulfide, bis[(methylthio)methyl] (9CI) (CA INDEX NAME)

MeS-CH₂-S-S-CH₂-SMe

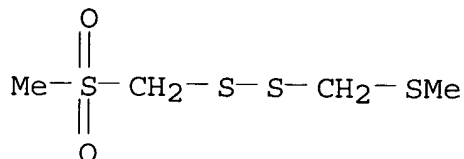
- CC 17-6 (Food and Feed Chemistry)
- ST sulfur **flavor** retention sensorial data detn
- IT Cheese
Flavor
Lipophilicity
Odor and Odorous substances
(retention of sulfur **flavors** by **food** matrix
and detn. of sensorial data independent of medium compn.)

- IT 78-92-2, 2-Butanol 78-93-3, 2-Butanone, biological studies
 107-47-1, tert-Butyl sulfide 110-66-7, Pentanethiol 110-81-6,
 Ethyl disulfide 141-78-6, Ethyl acetate, biological studies
 288-47-1, Thiazole 289-80-5, Pyridazine 289-95-2, Pyrimidine
 290-37-9, Pyrazine 352-93-2, Ethyl sulfide 420-12-2, Ethylene
 sulfide 505-10-2, Methionol 513-44-0 592-88-1, Allyl sulfide
 624-89-5, Ethyl methyl sulfide 625-60-5, S-Ethyl thioacetate
 625-80-9, Isopropyl sulfide 693-95-8, 4-Methylthiazole 928-47-2,
 S-Butyl thioacetate 1534-08-3, S-Methyl thioacetate 1618-26-4,
 Bis(methylthio)methane 1759-28-0, 4-Methyl-5-vinylthiazole
 2179-57-9, Allyl disulfide 2307-10-0, S-Propyl thioacetate
 2432-42-0 2432-51-1 3268-49-3, Methional 3658-80-8, Methyl
 trisulfide 5756-24-1, Methyl tetrasulfide 13623-11-5,
 2,4,5-Trimethylthiazole 15679-19-3, 2-Ethoxythiazole 42075-45-6
 59094-77-8, Ethyl thioacetate **85544-38-3**
 (retention of sulfur **flavors** by food matrix
 and detn. of sensorial data independent of medium compn.)
- IT 122-32-7, Triolein 7732-18-5, Water, biological studies
 9005-80-5, Inulin
 (retention of sulfur **flavors** by food matrix
 and detn. of sensorial data independent of medium compn.)
- L57 ANSWER 4 OF 9 HCA COPYRIGHT 2003 ACS
 121:279269 Sulfur compounds in wood garlic (*Scorodocarpus borneensis*
 Becc.) as versatile **food** components. Kubota, Kikue;
 Kobayashi, Akio (Department of Nutrition and Food Science,
 Ochanomizu University, Tokyo, 112, Japan). ACS Symposium Series,
 564 (Sulfur Compounds in Foods), 236-46 (English) 1994. CODEN:
 ACSMC8. ISSN: 0097-6156.
- AB The volatile **flavor** components of the fruit of
Scorodocarpus borneensis Becc. which is named "wood garlic" due to
 its garlic-like **smell**, were investigated. Although the
 volatiles contained a large amt. of ethanal, most of the components
 were sulfur-contg. Me methylthiomethyl disulfide (I) and
 bis(methylthiomethyl) disulfide (II), two polysulfides not
 previously identified in the *Allium* genus, were detd. to be potent
odor compds. of *S. borneensis* by a sensory evaluation. At a
 dil. concn., I produced the **smell** of freshly cut fruit,
 which II exhibited a slightly unpleasant **odor** which
 develops over time after cutting the fruit. In addn., the
 antimicrobial activity of the fruit was examd. Relatively strong
 activity was obsd. in the ethanol ext. of the fruit; II and
 methylthiomethyl (methylsulfonyl)methyl disulfide (III) were
 isolated as the active components. II exhibited relatively strong
 antifungal activity, while III, a novel compd., exhibited broader
 activities than II against bacteria and fungi. These results show
 that the fruit of *S. borneensis* possesses useful properties for use
 as a natural preservative.
- IT **85544-38-3**, Bis(methylthiomethyl) disulfide
143113-67-1, Methylthiomethyl (methylsulfonyl)methyl
 disulfide
 (sulfur compds. in wood garlic)

RN 85544-38-3 HCA
 CN Disulfide, bis[(methylthio)methyl] (9CI) (CA INDEX NAME)



RN 143113-67-1 HCA
 CN Disulfide, (methylsulfonyl)methyl (methylthio)methyl (9CI) (CA INDEX NAME)



- CC 17-6 (Food and Feed Chemistry)
 Section cross-reference(s): 10, 11
- ST wood garlic sulfide **flavor** antimicrobial; Scorodocarpus
 sulfide **flavor** antimicrobial
- IT Antibiotics
Flavor
 Odor and Odorous substances
 Scorodocarpus borneensis
 (sulfur compds. in wood garlic)
- IT 42474-44-2, Methyl methylthiomethyl disulfide 85544-38-3,
 Bis(methylthiomethyl) disulfide 143113-67-1,
 Methylthiomethyl (methylsulfonyl)methyl disulfide
 (sulfur compds. in wood garlic)
- L57 ANSWER 5 OF 9 HCA COPYRIGHT 2003 ACS
- 117:149621 The effect of xylose on the generation of volatiles from
 heated thiamin. Hincelin, Odile; Ames, Jennifer M.; Apriyantono,
 Anton; Elmore, J. Stephen (Ec. Natl. Super. Biol. Appl. Nutr.
 Aliment., Univ. Bourgogne, Dijon, 21100, Fr.). Food Chemistry,
 44(5), 381-9 (English) 1992. CODEN: FOCHDJ. ISSN: 0308-8146.
- AB Isolates of volatile thermal degrdn. products of xylose, thiamin and
 xylose-thiamin mixts. were prepd. by continuous steam distn.-solvent
 extn., and 11, 40 and 57 components were identified, resp., from
 each isolate. Pentane-2,3-dione was the most abundant component of
 the xylose isolate at 34% of the total volatiles. Sulfur compds.
 predominated in both the thiamin and xylose-thiamin isolates, with
 34 and 43 representatives, resp., being identified in each sample.
 Thirteen compds. are reported for the first time as thiamin thermal
 degrdn. products, and include 2-methylthiophen-3-thiol,
 2-methylthiophen-4-thiol, and their 2,3-dihydro and 4,5-dihydro
 derivs., three other thiophen derivs., two alicyclic sulfur compds.
 and two aliph. hydroxyketones. The addn. of xylose to the model
 system resulted in the identification of 27 components which could
 not be detected from xylose or thiamin alone, and 16 (15 of which
 are sulfur-contg.) may form as a result of xylose-thiamin

interactions. They include four bicyclic structures and four alicyclic sulfur components. The presence of xylose also resulted in a 4-5-fold increase in formation of the potent **meaty odor** compd., 2-methylfuran-3-thiol.

IT 6725-64-0, Methanedithiol
(formation of, in xylose and thiamin thermal degrdn.)
RN 6725-64-0 HCA
CN Methanedithiol (6CI, 7CI, 8CI, 9CI) (CA INDEX NAME)

HS-CH₂-SH

CC 17-2 (Food and Feed Chemistry)
IT **Odor** and **Odorous** substances
(from xylose and thiamin thermal degrdn.)
IT 64-19-7, Acetic acid, biological studies 78-92-2, Butan-2-ol
88-15-3, 2-Acetylthiophene 96-22-0, 3-Pentanone 96-48-0
98-00-0, 2-Furanmethanol 98-01-1, 2-Furaldehyde, biological
studies 107-87-9, Pentan-2-one 110-01-0D, C2-substituted
116-09-6 137-00-8, 5-(2-Hydroxyethyl)-4-methylthiazole
288-47-1D, Thiazole, C3-substituted 288-47-1D, Thiazole, derivs.
289-16-7, 1,2,4-Trithiolane 291-21-4, 1,3,5-Trithiane 291-22-5,
1,2,4,5-Tetrathiane 292-46-6, Lenthionine 431-03-8, Butanedione
554-14-3 600-14-6, Pentane-2,3-dione 611-13-2, 2-Methylfuroate
616-44-4, 3-Methylthiophene 625-86-5, 2,5-Dimethylfuran
693-95-8, 4-Methylthiazole 872-55-9D, iso-Bu derivs. 1071-73-4,
5-Hydroxypentan-2-one 1115-11-3 1192-62-7, 2-Acetylfuran
1193-79-9, 2-Methyl-5-acetylfuran 1487-15-6, 2-Methyl-4,5-
dihydrofuran 1534-08-3 1759-28-0, 4-Methyl-5-vinylthiazole
2527-76-6 2634-17-5 2758-18-1, 3-Methylcyclopent-2-enone
3188-00-9, 2-Methyltetrahydrofuran-3-one 3194-15-8 3581-91-7,
4,5-Dimethylthiazole 4437-51-8, Hexane-3,4-dione 4610-02-0
6725-64-0, Methanedithiol 6975-60-6, 1-(2-Furyl)propan-2-
one 7783-06-4, Hydrogen sulfide, biological studies 13679-70-4
13679-75-9 13679-85-1, 2-Methyltetrahydrothiophen-3-one
17233-71-5, Hexathiepane 23654-92-4, 3,5-Dimethyl-1,2,4-
trithiolane 26486-13-5 26486-15-7 26486-23-7 26494-09-7
26693-24-3, Kahweofuran 28588-74-1, 2-Methylfuran-3-thiol
28588-75-2 28632-15-7 40789-98-8 56079-00-6 56079-02-8
60965-59-5 60965-61-9 62119-77-1 65505-17-1,
2-Methyl-3-(methyldithio)furan 67411-25-0, 1-Methylbicyclo[3.3.0]-
2,4-dithia-8-oxaoctane 67633-97-0 69382-62-3, 1,1-Ethanedithiol
77214-04-1, 2-Methylenetetrahydrothiophene 77214-04-1D,
2-Methylenetetrahydrothiophene, derivs. 90238-76-9,
3-Methyl-1,2-dithian-4-one 90590-04-8D, 3-Furanthiol,
C2-substituted 91265-97-3 109537-56-6 143435-55-6
143435-56-7 143451-85-8 143454-54-0
(formation of, in xylose and thiamin thermal degrdn.)

L57 ANSWER 6 OF 9 HCA COPYRIGHT 2003 ACS

113:22375 Microbial spoilage of refrigerated fresh broilers. Part VI.
Identification of the volatile compounds produced during microbial

spoilage of **chicken** carcasses. Viehweg, S. H.; Schmitt, R. E.; Schmidt-Lorenz, W. (Dep. Food Sci., Swiss Fed. Inst. Technol., Zurich, CH-8092, Switz.). Lebensmittel-Wissenschaft und -Technologie, 22(6), 346-55 (English) 1989. CODEN: LBWTAP. ISSN: 0023-6438.

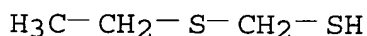
AB **Poultry** carcasses were stored in a desiccator at 4.degree. until the onset of spoilage. During spoilage the microflora and the volatile metabolic products were analyzed, the latter by direct headspace, distn., and adsorption methods. From the 4th day on, the flora consisted largely of pseudomonads. **Organoleptically** detectable spoilage was noticeable at about day 6. In fresh and 4-day-old carcasses, trace amts. of 27 alcs., aldehydes, and ketones were identified. From the 6th day the appearance of H₂S, MeSH, and 4 fatty acid esters signalled incipient spoilage. Only 2 days later 11 S compds. and 21 fatty acid esters were detected, some in considerable quantities. Aldehydes were no longer detectable, and the concn. of alcs. and ketones decreased sharply. In the course of the storage, 86 volatile products of microbial metab. were identified. H₂S, MeSH, as well as esters of a few fatty acids could be considered for use as an index of spoilage. Primary aliph. alcs. are a possible index of freshness.

IT 29414-49-1 127628-71-1

(formation of, in **chicken** carcass spoilage, off-
odor in relation to)

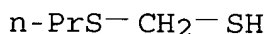
RN 29414-49-1 HCA

CN Methanethiol, (ethylthio)- (8CI, 9CI) (CA INDEX NAME)



RN 127628-71-1 HCA

CN Methanethiol, (propylthio)- (9CI) (CA INDEX NAME)



CC 17-7 (Food and Feed Chemistry)

ST **chicken** spoilage odor; alc **chicken**
spoilage; carbonyl **chicken** spoilage; fatty ester
chicken spoilage; sulfur compd **chicken** spoilage

IT Alcohols, biological studies
Aldehydes, biological studies
Ethers, biological studies
Thiols, biological studies

(formation of, in **chicken** carcass spoilage, off-
odor in relation to)

IT Ketones, biological studies

(Me, formation of, in **chicken** carcass spoilage, off-
odor in relation to)

IT Sulfides, biological studies
Trisulfides

(alkyl, formation of, in **chicken** carcass spoilage, off-

- odor in relation to)
- IT Carboxylic acids, esters
Fatty acids, esters
(alkyl esters, formation of, in **chicken** carcass
spoilage, off-odor in relation to)
- IT **Meat**
(**chicken**, volatile compd. formation in spoilage of
carcasses, off-odor in relation to)
- IT **Odor and Odorous substances**
(off-, of **chicken** carcasses in spoilage)
- IT 60-12-8, Benzeneethanol 66-25-1, Hexanal 71-23-8, 1-Propanol,
biological studies 71-36-3, 1-Butanol, biological studies
71-41-0, 1-Pentanol, biological studies 74-93-1, Methanethiol,
biological studies 75-18-3, Methyl sulfide 78-83-1, biological
studies 78-93-3, 2-Butanone, biological studies 80-62-6
97-62-1, Ethyl 2-methylpropanoate 100-52-7, Benzaldehyde,
biological studies 104-76-7 105-37-3, Ethyl propionate
105-54-4, Ethyl butyrate 105-57-7 106-32-1, Ethyl octanoate
106-68-3, 3-Octanone 107-87-9, 2-Pentanone 108-64-5, Ethyl
3-methylbutanoate 108-95-2, Phenol, biological studies 110-43-0,
2-Heptanone 110-62-3, Pentanal 111-11-5, Methyl octanoate
111-27-3, 1-Hexanol, biological studies 111-43-3 111-70-6,
1-Heptanol 111-71-7, Heptanal 111-87-5, 1-Octanol, biological
studies 112-12-9, 2-Undecanone 112-30-1, 1-Decanol 112-31-2,
Decanal 120-72-9, 1H-Indole, biological studies 123-51-3,
3-Methyl-1-butanol 123-66-0, Ethyl hexanoate 123-86-4, Butyl
acetate 124-19-6, Nonanal 137-32-6 141-06-0 141-78-6, Acetic
acid ethyl ester, biological studies 143-08-8, 1-Nonanol
513-53-1, 2-Butanethiol 543-49-7, 2-Heptanol 547-63-7, Methyl
2-methylpropanoate 565-61-7, 3-Methyl-2-pentanone 591-78-6,
2-Hexanone 598-75-4, 3-Methyl-2-butanol 624-92-0, Methyl
disulfide 628-28-4 628-29-5, Butyl methyl sulfide 628-99-9,
2-Nonanol 638-10-8, Ethyl 3-methyl-2-butenate 821-55-6,
2-Nonanone 868-57-5, Methyl 2-methylbutanoate 1534-08-3
1551-21-9 1647-12-7, Ethyl 2-methyl-3-butenate 1822-74-8,
Methyl vinyl sulfide 2177-67-5 2314-48-9, Dimethyl
trithiocarbonate 2432-51-1, Butanethioic acid S-methyl ester
2432-83-9 3391-86-4, 1-Octen-3-ol 3550-07-0 3658-80-8, Methyl
trisulfide 5756-24-1, Methyl tetrasulfide 6032-29-7, 2-Pentanol
7133-37-1, Cyclohexyl methyl sulfide 7452-79-1, Ethyl
2-methylbutanoate 7783-06-4, Hydrogen sulfide (H₂S), biological
studies 10359-64-5 10544-63-5, Ethyl 2-butenate 18060-77-0
20333-39-5, Ethyl methyl disulfide 27039-84-5, 5-Nonen-2-one
29414-49-1 31499-71-5, Ethyl methyl trisulfide
42075-43-4 72437-44-6, Ethyl methyl tetrasulfide 118972-43-3
120047-92-9 127628-69-7 **127628-71-1** 127648-39-9
(formation of, in **chicken** carcass spoilage, off-
odor in relation to)

L57 ANSWER 7 OF 9 HCA COPYRIGHT 2003 ACS

112:156860 Isolation and characterization of volatile sulfur-containing
meat flavor components in model systems.

Werkhoff, P.; Emberger, R.; Guentert, M.; Koepsel, M. (Res. Dep., Haarman und Reimer G.m.b.H., Holzminden, D-3450, Fed. Rep. Ger.). ACS Symposium Series, Volume Date 1988, 409 (Therm. Gener. Aromas), 460-78 (English) 1989. CODEN: ACSMC8. ISSN: 0097-6156.

- AB Reaction of an aq. soln. of cystine with thiamin, glutamate, and ascorbic acid produces a complex mixt. of compds. with an overall **flavor** resembling that of roasted **meat**. The reaction was carried out at 120.degree. for 0.5 h at pH 5.0 in a closed system. The **aroma** compds. were isolated by simultaneous steam distn./solvent extn. The **flavor** conc. was pre-sepd. by liq. chromatog. on silica gel and subsequently analyzed by GC and GC/MS. Unknown **flavor** components were isolated by preparative capillary gas chromatog. and the structures were elucidated on the basis of spectroscopic studies. Various heterocyclic thioethers, disulfides, and dithiohemiacetals were identified for the first time in the volatiles of the heated **meat flavor** model mixt. Sensory properties of newly identified **flavor** components are discussed. In most cases, identifications were confirmed by org. syntheses.
- IT 29414-47-9
(of roasted **meat flavor**, model)
- RN 29414-47-9 HCA
- CN Methanethiol, (methylthio)- (6CI, 7CI, 8CI, 9CI) (CA INDEX NAME)

HS-CH₂-S-CH₃

- CC 17-2 (Food and Feed Chemistry)
- ST roasted **meat flavor** sulfur volatile model;
meat flavor volatile sulfur compd model;
heterocyclic sulfur compd **meat flavor**; disulfide
compd **meat flavor**; thiophene **meat flavor**
- IT Disulfides
Thiols, biological studies
(of roasted **meat flavor**, model)
- IT Odor and Odorous substances
(of roasted **meat** model, sulfur-contg. compds. in)
- IT **Meat**
(sulfur-contg. **flavor** components of roasted model)
- IT Sulfides, biological studies
(heterocyclic group-contg., of roasted **meat flavor**, model)
- IT Heterocyclic compounds
(sulfur, of roasted **meat flavor**, model)
- IT 7704-34-9
(heterocyclic compounds, sulfur, of roasted **meat flavor**, model)
- IT 2527-76-6, 2-Methyl-3-thiophenethiol
(of roasted **meat flavor** model and
dimerization of)
- IT 28588-74-1, 2-Methyl-3-furanthiol

(of roasted **meat flavor** model and reaction
with tosylated Me tetrahydrothiophene)

IT 50-81-7D, L-Ascorbic acid, reaction products with cystine and
glutamate and thiamin 56-86-0D, L-Glutamic acid, reaction products
with ascorbate and cystine and thiamin 56-89-3D, L-Cystine,
reaction products with ascorbate and glutamate and thiamin
59-43-8D, reaction products with ascorbate and cystine and glutamate
110-01-0D, Thiolane, derivs. 110-02-1D, Thiophene, derivs.
288-47-1D, Thiazole, derivs. 1613-51-0D, Thiane, derivs.
16238-20-3 28588-75-2, Bis-(2-methyl-3-furyl)disulfide
29414-47-9 31331-53-0 57067-01-3 57067-25-1
85196-66-3 91265-97-3 109537-56-6 124619-92-7 124619-93-8
124619-94-9 124619-95-0 124619-96-1 124619-97-2 124619-98-3
124650-76-6

(of roasted **meat flavor**, model)

L57 ANSWER 8 OF 9 HCA COPYRIGHT 2003 ACS

112:137692 Isolation and characterization of volatile sulfur-containing
meat flavor components in model systems.

Werkhoff, Peter; Bruening, Juergen; Emberger, Roland; Guentert,
Matthias; Koepsel, Manfred; Kuhn, Walter; Surburg, Horst (Res. Dep.,
Haarmann und Reimer G.m.b.H., Holzminden, D-3450, Germany). Journal
of Agricultural and Food Chemistry, 38(3), 777-91 (English) 1990.
CODEN: JAFCAU. ISSN: 0021-8561.

AB Reaction of an aq. soln. of cystine with thiamin, glutamate, and
ascorbic acid produced a complex mixt. of compds. with an overall
flavor resembling that of roasted **meat**. The
reaction was carried out at 120.degree. for 0.5 h at pH 5.0 in a
closed system. The **aroma** compds. were isolated by
simultaneous steam distn.-solvent extn. (Likens-Nickerson). The
flavor conc. was presepd. by liq. chromatog. on silica gel
with a pentane-ether gradient and subsequently analyzed by GC and
GC/MS. S-contg. components were detected by flame photometry.
Unknown **flavor** components were isolated by preparative
capillary gas chromatog., and the structures were elucidated on the
basis of spectroscopic studies. Various heterocyclic thioethers,
disulfides, and hemidithioacetals were identified for the first time
in the volatiles of the heated **meat flavor** model
mixt. Formation pathways, sensory properties, and spectroscopic
data of newly identified **flavor** components are discussed.
In most cases, identifications were confirmed by org. syntheses.
Some of the most important mass spectrometric fragmentation pathways
are proposed.

IT **29414-47-9P**

(prepn. of)

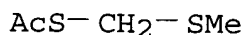
RN 29414-47-9 HCA

CN Methanethiol, (methylthio)- (6CI, 7CI, 8CI, 9CI) (CA INDEX NAME)

HS- CH₂- S- CH₃

CC 17-2 (Food and Feed Chemistry)

- Section cross-reference(s): 27, 28
- ST roasted **meat** flavor sulfur compd
- IT **Flavor**
 Odor and Odorous substances
 (of roasted **meat**, sulfur-contg. compds. of models for)
- IT **Flavoring** materials
 (**meat**, sulfur-contg. compds. of, from cystine reaction
 with ascorbic acid and monosodium glutamate and thiamin)
- IT 16238-20-3P **29414-47-9P** 31331-53-0P 57067-01-3P
 57067-25-1P 109537-56-6P 124619-92-7P 124619-93-8P
 124619-94-9P 124619-95-0P 124619-96-1P 124619-97-2P
 124619-98-3P 124650-76-6P
 (prepn. of)
- IT 56-89-3, Cystine, reactions
 (reaction of, with ascorbic acid and monosodium glutamate and
 thiamin, sulfur-contg. compds. and roasted **meat**
 aroma formation in)
- IT 67-03-8, Thiamin hydrochloride
 (reaction of, with cystine and ascorbic acid and monosodium
 glutamate, sulfur-contg. compds. and roasted **meat**
 aroma formation in)
- IT 142-47-2, Monosodium glutamate
 (reaction of, with cystine and ascorbic acid and thiamin,
 sulfur-contg. compds. and roasted **meat** **aroma**
 formation in)
- IT 50-81-7, L-Ascorbic acid, reactions
 (reaction of, with cystine and monosodium glutamate and thiamin,
 sulfur-contg. compds. and roasted **meat** **aroma**
 formation in)
- L57 ANSWER 9 OF 9 HCA COPYRIGHT 2003 ACS
- 90:86666 Investigation of the head-space of roasted **meat**. II.
 Synthesis of substituted 2,4,5-trithia-hexanes. Dubs, Paul;
 Stuessi, Rita (Res. Co., Givaudan Ltd., Zurich, Switz.). Helvetica
 Chimica Acta, 61(7), 2351-9 (English) 1978. CODEN: HCACAV. ISSN:
 0018-019X.
- AB The title compds. MeSSCRR1SMe (I; R = H, alkyl; R1 = alkyl, aryl),
 found in roasted **meat**, were synthesized by 2 methods.
 Thus, I (R = H; R1 = H, Me, Et, Ph) were prepd. by reaction of
 MeC(O)SCHR1SMe with excess (MeS)2 in the presence of catalytic amts.
 of NaOEt. Alternatively, RCHR1SSCHRR1 was chlorinated with Cl2 to
 give ClCRR1SCL, which was treated with NaSMe to give I (R = H, Me;
 R1 = Me2CH, Me2CHCH2, EtCHMe, Me, Et).
- IT **38634-59-2P**
 (prepn. and reaction of, with di-Me disulfide)
- RN 38634-59-2 HCA
- CN Ethanethioic acid, S-[(methylthio)methyl] ester (9CI) (CA INDEX
 NAME)



CC 23-9 (Aliphatic Compounds)
Section cross-reference(s): 17
ST roasted **meat** trithiahexane
IT **Meat**
(pork, prepn. of trithiahexanes from)
IT 38634-59-2P 69078-86-0P
(prepn. and reaction of, with di-Me disulfide)

=> d 158 1-13 cbib abs hitstr hitind

L58 ANSWER 1 OF 13 HCA COPYRIGHT 2003 ACS
137:309796 Investigating sensory characteristics and volatile components in boiled scallop **aroma** using chemometric techniques.
Morita, Kae; Kubota, Kikue; Aishima, Tetsuo (Department of Nutrition and Food Science, Ochanomizu University, 2-1-1 Otsuka, Bunkyo-ku, Tokyo, 112-8610, Japan). Food Chemistry, 78(1), 39-45 (English) 2002. CODEN: FOCHDJ. ISSN: 0308-8146. Publisher: Elsevier Science Ltd..

AB A three-level full-factorial design for pH (2, 6.7 and 11.4) and parts (S: mantle muscle, M: adductor muscle and W: mantle and adductor muscle) was applied to investigating the influence of these factors on generating the boiled scallop **aroma**. Quant. descriptive anal., using nine attributes, was used to describe the **aroma** property of boiled scallop. M and W samples, at pH 6.7, showed higher scores for the characteristics "boiled scallop", "kamaboko (steamed surimi)" and "sweet". "Sour" and "irritate" were characteristic of M and W samples at pH 2 and pH 11.4, resp. Response surfaces clearly showed how pH and parts influenced the generation of each attribute. Partial least squares regression (PLSR) models, calcd. using influential GC-MS peaks, were highly predictable. Considering **aroma** properties of influential volatile components, selection by PLSR is easily interpretable in relation to each attribute.

IT 472965-82-5
(sensory characteristics and volatile components in boiled scallop **aroma** investigated using chemometric techniques)

RN 472965-82-5 HCA

CN Methanethiol, dithiobis- (9CI) (CA INDEX NAME)

HS-CH₂-S-S-CH₂-SH

CC 17-7 (Food and Feed Chemistry)
ST Patinopecten boiling **flavor**; scallop boiling **flavor**
IT Cooking
(boiling; sensory characteristics and volatile components in boiled scallop **aroma** investigated using chemometric techniques)
IT **Flavor**

Odor and Odorous substances

Patinopecten yessoensis

pH

(sensory characteristics and volatile components in boiled scallop **aroma** investigated using chemometric techniques)

- IT 64-19-7, Acetic acid, biological studies 67-68-5, Dimethyl sulfoxide, biological studies 68-12-2, N,N-Dimethylformamide, biological studies 98-03-3, 2-Thiophenecarbaldehyde 111-27-3, Hexanol, biological studies 123-32-0, 2,5-Dimethylpyrazine 124-07-2, Octanoic acid, biological studies 127-19-5, N,N-Dimethylacetamide 142-62-1, Hexanoic acid, biological studies 143-08-8, Nonanol 497-23-4, 2(5H)-Furanone 513-86-0, 3-Hydroxy-2-butanone 557-48-2, 2,6-Nonadienal, (E,Z)- 565-60-6, 3-Methyl-2-pentanol 584-02-1, 3-Pentanol 591-12-8, 5-Methyl-2(3H)-furanone 598-35-6 624-92-0, Dimethyl disulfide 758-16-7, Dimethylthioformamide 932-62-7, 3-Acetyl-1-methylpyrrole 1072-83-9, 2-Acetylpyrrole 1120-73-6, 2-Cyclopenten-1-one, 2-Methyl- 1124-11-4, Tetramethylpyrazine 1192-62-7, 2-Acetylfuran 1569-50-2, 3-Penten-2-ol 1576-96-1, (E)-2-Pentenol 3360-41-6, Benzenebutanol 3391-86-4, 1-Octen-3-ol 4265-25-2, 2-Methylbenzofuran 5830-30-8 5834-16-2, 3-Methyl-2-thiophenecarboxaldehyde 5910-89-4, 2,3-Dimethylpyrazine 17398-16-2, Trimethylethylpyrazine 22047-27-4, 1-(5-Methyl-2-pyrazinyl)-1-ethanone 22104-78-5, 2-Octen-1-ol 52480-43-0, 4,5-Dimethylfurfural 120550-69-8 **472965-82-5**
 (sensory characteristics and volatile components in boiled scallop **aroma** investigated using chemometric techniques)

L58 ANSWER 2 OF 13 HCA COPYRIGHT 2003 ACS

137:5320 Analysis of the headspace **aroma** compounds of the seeds of the Cameroonian "garlic plant" *Hua gabonii* using SPME/GC/FID, SPME/GC/MS and **olfactometry**. Jirovetz, Leopold; Buchbauer, Gerhard; Ngassoum, Martin Benoit; Geissler, Margit (Institute of Pharmaceutical Chemistry, University of Vienna, Vienna, A-1090, Austria). European Food Research and Technology, 214(3), 212-215 (English) 2002. CODEN: EFRTFO. ISSN: 1438-2377. Publisher: Springer-Verlag.

AB The headspace **aroma** compds. of the seeds of the "garlic plant" *Hua gabonii* (Huaceae) from Cameroon were analyzed by solid-phase-micro-extn./gas chromatog./ flame ionization detector (SPME/GC/FID), SPME/GC/mass spectrometry (MS), and **olfactoric** evaluations. Surprisingly the typical garlic-like **aroma** of the headspace (SPME) sample is not only the result of well-known disulfides of *Allium* species, but - in plants with garlic **aroma** - of hitherto rather rarely identified Me methylthiomethyl disulfide (2,4,5-trithiahexane) and di-(methylthiomethyl) disulfide (2,4,5,7-tetrathiaoctane) in concns. of 23.3% and 21.4% resp. (calcd. as percentage peak area of SPME/GC/FID anal. using a non-polar column). As further main compds. (concns. higher than 1.0%) of this SPME-headspace sample of

H. gabonii seeds the monoterpenes p-cymene (1.1%), .beta.-pinene (1.1%), pinocarveol (1.2%), myrtenol (1.3%), 1,8-cineole (1.5%), myrtenal (1.7%), .alpha.-terpineol (2.1%), .alpha.-pinene (3.6%), .alpha.-terpinolene (4.9%), terpinen-4-ol (8.1%) and the sesquiterpenes .beta.-caryophyllene (2.6%) and .alpha.-copaene (4.9%) as well as the sulfidic compds. diallyl trisulfide (1.5%), di-Pr trisulfide (1.7%) and Me Pr tetrasulfide (2.2%), were identified. The characteristic disulfide components of common garlic, like diallyl disulfide, were found only as minor compds. A correlation of identified volatiles of the H. gaboni seeds responsible for the characteristic garlic **aroma** with fresh terpenic notes is addnl. given.

IT 85544-38-3

(headspace **aroma** compds. of Hua gabonii seeds detected by solid-pase microextn., GC, MS, and **olfactometry**)

RN 85544-38-3 HCA

CN Disulfide, bis[(methylthio)methyl] (9CI) (CA INDEX NAME)

MeS-CH₂-S-S-CH₂-SMe

CC 17-6 (Food and Feed Chemistry)

ST **aroma** volatile disulfides sulfur compd Hua

IT **Flavor**

Hua gabonii

Odor and Odorous substances

Seed

(headspace **aroma** compds. of Hua gabonii seeds detected by solid-pase microextn., GC, MS, and **olfactometry**)

IT Disulfides

(headspace **aroma** compds. of Hua gabonii seeds detected by solid-pase microextn., GC, MS, and **olfactometry**)

IT Organic compounds, biological studies

(sulfur-contg.; headspace **aroma** compds. of Hua gabonii seeds detected by solid-pase microextn., GC, MS, and **olfactometry**)

IT 78-70-6, Linalool 80-56-8, .alpha.-Pinene 87-44-5, .beta.-Caryophyllene 89-83-8, Thymol 93-15-2, Methyl eugenol 97-53-0, Eugenol 98-55-5, .alpha.-Terpineol 99-83-2, .alpha.-Phellandrene 99-85-4, .gamma.-Terpinene 99-86-5, .alpha.-Terpinene 99-87-6, p-Cymene 106-22-9, .beta.-Citronellol 110-81-6, Ethyl disulfide 123-35-3, Myrcene 127-91-3, .beta.-Pinene 138-86-3, Limonene 141-78-6, Ethyl acetate, biological studies 470-82-6, 1,8-Cineole 489-86-1, Guaiol 507-70-0, Borneol 515-00-4, Myrtenol 515-13-9, .beta.-Elemene 562-74-3, Terpinen-4-ol 564-94-3, Myrtenal 586-62-9 592-88-1, Diallyl sulfide 624-92-0, Dimethyl disulfide 629-19-6, Dipropyl disulfide 639-99-6, Elemol 1139-30-6, Caryophyllene epoxide 1632-73-1, Fenchol 2050-87-5, Diallyl trisulfide 2179-57-9, Diallyl disulfide 2179-58-0, Allyl methyl disulfide 2444-49-7, Diallyl tetrasulfide 3387-41-5, Sabinene 3658-80-8, Dimethyl trisulfide 3779-61-1, trans-.beta.-Ocimene 3856-25-5,

.alpha.-Copaene 4437-20-1, Difurfuryl disulfide 4798-44-1,
 1-Hexen-3-ol 5947-36-4, Pinocarveol 6028-61-1, Dipropyl
 trisulfide 6750-60-3, Spathulenol 6753-98-6, .alpha.-Humulene
 7212-44-4, Nerolidol 8007-35-0, Terpinyl acetate 18794-84-8,
 trans-.beta.-Farnesene 23986-74-5, Germacrene D 33368-82-0
 34135-85-8, Allyl methyl trisulfide 39029-41-9, .gamma.-Cadinene
 42474-44-2, Methyl methylthiomethyl disulfide **85544-38-3**
 87148-08-1, Methyl propyl tetrasulfide 88496-84-8
 (headspace **aroma** compds. of Hua gabonii seeds detected
 by solid-pase microextn., GC, MS, and **olfactometry**)

L58 ANSWER 3 OF 13 HCA COPYRIGHT 2003 ACS

136:385213 Analysis of the **aroma** compounds of the seeds of the
 Cameroonian "garlic tree" Scorodophloeus zenkeri Harms. using GC-MS,
 SPME-GC-MS and **olfactometry**. Jirovetz, L.; Buchbauer, G.;
 Ngassoum, M. B. (Institute of Pharmaceutical Chemistry, University
 of Vienna, Vienna, A-1090, Austria). Ernaehrung (Vienna, Austria),
 25(9), 354-356 (English) 2001. CODEN: ERNRDC. ISSN: 0250-1554.
 Publisher: Fachzeitschriftenverlagsgesellschaft mbH.

AB The **aroma** compds. of the seeds of the "garlic tree"
 Scorodophloeus zenkeri (Caesalpiniaceae, Fabaceae) from Cameroon
 were analyzed by GC-FID, SPME-GC-FID, GC-MS, SPME-GC-MS and
olfactoric evaluations. Surprisingly the typical
 garlic-like **aroma** of the headspace (SPME) sample is not
 only the result of well-known disulfides of Allium-species, but - in
 plants with garlic **aroma** - of hitherto now rather rarely
 identified Me methylthiomethyl disulfide (=2,4,5-trithiahexane) of
 6.09%. The characteristic disulfide components of common garlic,
 like diallyl disulfide, were found only in lower concns. The main
 compds. of this headspace sample are sesquiterpenes with a high
 concn. of .beta.-caryophyllene (59.57%).

IT **85544-38-3**

(**aroma** compds. of seeds Scorodophloeus zenkeri detected
 by solid phase microextn., GC-MS, and **olfactometry**)

RN 85544-38-3 HCA

CN Disulfide, bis[(methylthio)methyl] (9CI) (CA INDEX NAME)

MeS-CH₂-S-S-CH₂-SMe

CC 17-10 (Food and Feed Chemistry)

ST **aroma flavor** seed Scorodophloeus sulfur compd

IT **Flavor**

Odor and Odorous substances

Scorodophloeus zenkeri

(**aroma** compds. of seeds Scorodophloeus zenkeri detected
 by solid phase microextn., GC-MS, and **olfactometry**)

IT Monoterpenes

Sesquiterpenes

(**aroma** compds. of seeds Scorodophloeus zenkeri detected
 by solid phase microextn., GC-MS, and **olfactometry**)

IT Acids, biological studies

(org.; **aroma** compds. of seeds *Scorodophloeus zenkeri* detected by solid phase microextn., GC-MS, and **olfactometry**)

IT Organic compounds, biological studies

(sulfur-contg.; **aroma** compds. of seeds *Scorodophloeus zenkeri* detected by solid phase microextn., GC-MS, and **olfactometry**)

IT 64-19-7, Acetic acid, biological studies 78-70-6, Linalool
87-44-5, .beta.-Caryophyllene 89-83-8, Thymol 98-55-5,
.alpha.-Terpineol 100-52-7, Benzaldehyde, biological studies
123-35-3, .beta.-Myrcene 124-07-2, Octanoic acid, biological
studies 142-62-1, Hexanoic acid, biological studies 515-13-9,
.beta.-Elemene 562-74-3, Terpinen-4-ol 2050-87-5, Diallyl
trisulfide 2179-57-9, Diallyl disulfide 3658-80-8, Dimethyl
trisulfide 3779-61-1, trans-.beta.-Ocimene 3856-25-5,
.alpha.-Copaene 4798-44-1, 1-Hexen-3-ol 6753-98-6,
.alpha.-Humulene 18794-84-8, .beta.-Farnesene 23986-74-5,
Germacrene D 28387-44-2, Germacrene A 29063-28-3, Octanol
33368-82-0, Allyl propenyl disulfide 39029-41-9, .gamma.-Cadinene
42474-44-2, Methyl methylthiomethyl disulfide **85544-38-3**
88496-84-8 185992-79-4

(**aroma** compds. of seeds *Scorodophloeus zenkeri* detected by solid phase microextn., GC-MS, and **olfactometry**)

L58 ANSWER 4 OF 13 HCA COPYRIGHT 2003 ACS

136:368748 Isolation of new alkylthiosulfides from the essential oil and extracts from the bark of *Scorodophloeus zenkeri* Harms. Kouokam, J. Clavin; Zapp, Josef; Becker, Hans (Pharmakognosie und Analytische Phytochemie, Universitat des Saarlandes, Saarbrücken, D-66041, Germany). Zeitschrift fuer Naturforschung, C: Journal of Biosciences, 56(11/12), 1003-1007 (English) 2001. CODEN: ZNCBDA. ISSN: 0939-5075. Publisher: Verlag der Zeitschrift fuer Naturforschung.

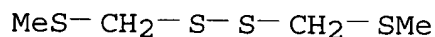
AB 2,3,5-Trithiahexane, 2,3,4,6-tetrathiaheptane, 2,4,5,7-tetrathiaoctane, two pentathianonanes, 2,4,5,7,9-pentathiadecane and two hexathiaundecanes were isolated from the essential oil and exts. from the bark of *Scorodophloeus zenkeri* Harms. Four other thioalkanes were found in small amts. in the essential oil. The **spice** can thus be considered as an important source of alkylthiosulfides.

IT **85544-38-3**, 2,4,5,7-Tetrathiaoctane

(from *Scorodophloeus zenkeri* bark oil and exts.)

RN 85544-38-3 HCA

CN Disulfide, bis[(methylthio)methyl] (9CI) (CA INDEX NAME)



CC 17-6 (Food and Feed Chemistry)

Section cross-reference(s): 11, 62

IT **Odor** and **Odorous** substances

(alkylthiosulfides from *Scorodophloeus zenkeri* bark oil and

exts.)

IT 289-16-7, 1,2,4-Trithiolane 5418-86-0, Tris-methylthiomethane
5756-24-1, Dimethyltetrasulfide 42474-44-2, 2,3,5-Trithiahexane
85544-38-3, 2,4,5,7-Tetrathiaoctane 88496-84-8
155994-67-5, 2,4,5,7,9-Pentathiadecane 185992-79-4,
2,3,4,6-Tetrathiaheptane 185992-81-8, 2,3,4,6,8-Pentathianonane
244171-19-5, 2,3,5,7-Tetrathiaoctane 423765-79-1,
2,4,5,7,8,10-Hexathiaundecane 423765-80-4, 2,3,5,6,8,10-
Hexathiaundecane

(from *Scorodophloeus zenkeri* bark oil and exts.)

L58 ANSWER 5 OF 13 HCA COPYRIGHT 2003 ACS

135:151956 **Flavor** of aromatic fruits and **spices** from
the tropical rain forest. A field study. Gassenmeier, Klaus; Yang,
Xiaogen; Grab, Willi; Peppet, Jeff; Eilerman, Robert (Givaudan
Flavours Ltd., Dubendorf, 8600, Switz.). Chimia, 55(5), 435-440
(English) 2001. CODEN: CHIMAD. ISSN: 0009-4293. Publisher: Neue
Schweizerische Chemische Gesellschaft.

AB Consumers demand new and improved **flavor** sensations, which
cannot always be fulfilled by traditional **flavors** from
known fruits. Inspiration for new developments in **flavors**
may be generated from plant material originating from the tropical
rain forests. The tropics house 80 to 90% of all plant species and
the arom. aspects of most of these are entirely unknown. Field
methods for the collection of samples, the isolation and
conservation of the **aroma** compds. in very remote areas are
presented. The overall **flavor** profile and the key
aroma compds. of selected fruits and "garlic" barks
collected from the Gabonese tropical rain forest "foret des
Abeilles" are described.

IT **85544-38-3**, 2,4,5,7-Tetrathiaoctane
(**flavor** compds. and **spices** of tropical
fruits)

RN 85544-38-3 HCA

CN Disulfide, bis[(methylthio)methyl] (9CI) (CA INDEX NAME)

MeS-CH₂-S-S-CH₂-SMe

CC 17-10 (Food and Feed Chemistry)

ST **flavor spice** tropical fruit

IT *Afrostryrax kamerunensis*

Dacryodes kleineana

Delpyodora macrophylla

Flavor

Garcinia epunctata

Hua gabonii

Landolphia owariensis

Spices

(**flavor** compds. and **spices** of tropical
fruits)

IT Fruit

(tropical fruit; **flavor** compds. and **spices** of tropical fruits)

- IT 74-93-1, Methanethiol, biological studies 75-18-3, Dimethyl sulfide 78-70-6, Linalool 80-56-8, .alpha.-Pinene 87-44-5, Caryophyllene 93-58-3, Methyl benzoate 98-55-5, .alpha.-Terpineol 106-70-7, Methyl hexanoate 119-36-8, Methyl salicylate 123-51-3, 3-Methyl-1-butanol 124-13-0, Octanal 127-91-3, .beta.-Pinene 289-16-7, 1,2,4-Trithiolane 562-74-3, 1618-26-4, 2,4-Dithiapentane 2548-87-0, (E)-2-Octenal 3338-55-4, cis-.beta.-Ocimene 3658-80-8, Dimethyl trisulfide 3779-61-1, trans-.beta.-Ocimene 4630-07-3, Valencene 6540-86-9, 2,4,6-Trithiaheptane 11063-77-7, cis-Linalool oxide 11063-78-8, trans-Linalool oxide 13894-63-8, Methyl (E)-2-hexenoate 23986-74-5, Germacrene D 42474-44-2, 2,3,5-Trithiahexane 85544-38-3, 2,4,5,7-Tetrathiaoctane 263351-11-7, Heptenal, (E) -
(**flavor** compds. and **spices** of tropical fruits)

L58 ANSWER 6 OF 13 HCA COPYRIGHT 2003 ACS

129:135394 Application of onion and garlic **flavors** in spaghetti manufacture. Faheid, Siham M. M. (Department Food Technology Dairy, National Research Center, Cairo, Egypt). Deutsche Lebensmittel-Rundschau, 94(6), 187-192 (English) 1998. CODEN: DLRUAJ. ISSN: 0012-0413. Publisher: Wissenschaftliche Verlagsgesellschaft mbH.

AB Volatile oils of Egyptian onion and garlic were obtained by steam distn. and analyzed and identified by gas chromatog. and combined GC-MS. The effect of **flavoring** spaghetti with Egyptian onion and garlic (powder at levels of 1, 5, and 10% and volatile oil at levels of 0.002, 0.01, and 0.02%) as natural **flavors** on the cooking quality and sensory evaluation of cooked spaghetti by 2 methods, blanching and frying, were studied. The **flavor** components of Egyptian onion volatile oil can be classified in the 3 groups. The group with the major compds. (46.2% of onion oil) contains di-Pr disulfide (17.85%), Me Pr trisulfide (17.65%), and di-Pr trisulfide (10.70%). The group with minor compds. (44.68% of onion oil) contains 14 compds. The group with trace compds. (9.12%) contains 28 compds. The **flavor** components of Egyptian garlic volatile oil can be classified in the major compds. (80.81% of garlic oil), contg. diallyl trisulfide (33.66%), diallyl disulfide (30.33%) and Me allyl trisulfide (16.82%), minor compds. (15.91% of garlic oil) contg. 5 compds. Traces compds. (3.28%) contain 27 compds. The spaghetti **flavoring** with onion and garlic volatile oil had little effect for cooking quality, while **flavoring** spaghetti with onion and garlic in the powder form, showed better cooking quality when compared to **flavorless** spaghetti. The sensory evaluation revealed that, spaghetti **flavoring** with onion or garlic either powder or volatile oil specially when cooked by frying method were favorable than that **flavorless** spaghetti.

IT 6725-64-0, Methanedithiol

(occurrence in onion and garlic oil for **flavor**
application in spaghetti manuf.)

RN 6725-64-0 HCA

CN Methanedithiol (6CI, 7CI, 8CI, 9CI) (CA INDEX NAME)

HS-CH₂-SH

CC 17-6 (Food and Feed Chemistry)

ST onion garlic **flavor** spaghetti manufg

IT Thioethers

(aliph.; occurrence in onion and garlic oil for **flavor**
application in spaghetti manuf.)

IT **Flavor**

Pasta

(application of onion and garlic **flavors** in spaghetti
manuf.)

IT Blanching

Cooking

(effect of onion and garlic oil for **flavor** application
in spaghetti cooking)

IT Cooking

(frying; effect of onion and garlic oil for **flavor**
application in spaghetti cooking)

IT Essential oils

(garlic; application of onion and garlic **flavors** in
spaghetti manuf.)

IT Essential oils

Trisulfides

(occurrence in onion and garlic oil for **flavor**
application in spaghetti manuf.)

IT Essential oils

(onion; application of onion and garlic **flavors** in
spaghetti manuf.)

IT Disulfides

(org.; occurrence in onion and garlic oil for **flavor**
application in spaghetti manuf.)

IT 62-53-3, Aniline, occurrence 75-18-3, Dimethyl sulfide 107-18-6,
2-Propen-1-ol, occurrence 110-02-1D, Thiophene, derivs.
111-27-3, 1-Hexanol, occurrence 115-07-1, Propene, occurrence
123-38-6, Propanal, occurrence 591-82-2, Isobutyl isothiocyanate
592-88-1, Diallyl sulfide 593-08-8, Methyl undecyl ketone
624-89-5, Ethyl methyl sulfide 624-92-0, Dimethyl disulfide
629-19-6, Dipropyl disulfide 632-15-5, 3,4-Dimethylthiophene
638-00-6, 2,4-Dimethylthiophene 638-02-8, 2,5-Dimethylthiophene
1551-31-1, 2,5-Dimethyltetrahydrothiophene 2050-87-5, Diallyl
trisulfide 2179-57-9, Diallyl disulfide 2179-58-0, Methyl allyl
disulfide 2179-59-1, Propyl allyl disulfide 2179-60-4, Methyl
propyl disulfide 3658-80-8, Dimethyl trisulfide 3710-43-8,
2,4-Dimethylfuran 5756-24-1, Dimethyl tetrasulfide 5943-34-0,
Isopropyl trisulfide 6028-61-1, Dipropyl trisulfide
6725-64-0, Methanedithiol 7783-06-4, Hydrogen sulfide,

occurrence 10152-76-8, Methyl allyl sulfide 17619-36-2, Methyl propyl trisulfide 23838-18-8, cis-Methyl propenyl disulfide 23838-19-9, trans-Methyl propenyl disulfide 23838-20-2, cis-Propyl 1-propenyl disulfide 23838-21-3, trans-Propenyl propyl disulfide 23838-24-6, cis-Methyl propenyl trisulfide 23838-25-7, trans-Methyl propenyl trisulfide 23838-26-8 23838-27-9 27817-67-0, Allyl propyl sulfide 33672-51-4, Isopropyl propyl disulfide 33922-73-5, Allyl propyl trisulfide 34135-85-8, Allyl methyl trisulfide 52687-98-6, Dipropyl tetrasulfide 62488-53-3 79869-58-2, Propanethiol 80028-57-5, 2-Vinyl-4H-1,3-dithiin (occurrence in onion and garlic oil for **flavor** application in spaghetti manuf.)

L58 ANSWER 7 OF 13 HCA COPYRIGHT 2003 ACS

126:143460 Volatile **Flavor** Constituents of Fresh *Marasmius alliaceus* (Garlic *Marasmius*). Rapior, Sylvie; Breheret, Sophie; Talou, Thierry; Bessiere, Jean-Marie (Laboratoire de Botanique Phytochimie et Mycologie, Faculte de Pharmacie Universite Montpellier I, Montpellier, F-34060, Fr.). Journal of Agricultural and Food Chemistry, 45(3), 820-825 (English) 1997. CODEN: JAFCAU. ISSN: 0021-8561. Publisher: American Chemical Society.

AB Comparative analyses of volatile **flavor** constituents of fresh wild *M. alliaceus* were carried out by org. solvent extn. and dynamic headspace concn. using GC/MS and GC/sniffing. Sixteen and 27 volatile components were identified by solvent and headspace methods, resp. The major linear sulfur-contg. compds. identified in *Marasmius* species were 2,4,5,7-tetrathiaoctane and 2,3,5-trithiahexane by solvent extn. and 2,4-dithiapentane, 3,4-dithiahexane, and 2-thiapentanal by headspace concn. Seven volatile compds. were identified by both methods, i.e., 1,3-dithietane, benzaldehyde, 2,3,5-trithiahexane, 2,3,4,6-tetrathiaheptane, and 3 di-Me polysulfide components (di-Me disulfide, di-Me trisulfide, di-Me tetrasulfide). Solvent extn. and headspace concn. analyzed all volatile components present in mushrooms and only exhaled compds., resp.

IT 85544-38-3, 2,4,5,7-Tetrathiaoctane
(volatile **flavor** constituents of fresh *Marasmius alliaceus*)

RN 85544-38-3 HCA

CN Disulfide, bis[(methylthio)methyl] (9CI) (CA INDEX NAME)

MeS-CH₂-S-S-CH₂-SMe

CC 17-10 (Food and Feed Chemistry)

ST volatile **flavor** constituent *Marasmius*

IT **Flavor**

Marasmius alliaceus

Volatile substances

(volatile **flavor** constituents of fresh *Marasmius alliaceus*)

IT Sulfides, biological studies

(volatile **flavor** constituents of fresh *Marasmius alliaceus*)

IT 66-25-1, Hexanal 71-41-0, 1-Pentanol, biological studies
 100-52-7, Benzaldehyde, biological studies 106-68-3, Octan-3-one
 110-62-3, Pentanal 110-81-6, 3,4-Dithiahexane 123-51-3
 123-73-9, (E)-But-2-enal 142-83-6, (E,E)-Hexa-2,4-dienal
 287-53-6, 1,3-Dithietane 289-16-7, 1,2,4-Trithiolane 590-86-3,
 3-Methylbutanal 598-75-4, 3-Methylbutan-2-ol 624-92-0, Dimethyl
 disulfide 1115-11-3, 2-Methylbut-2-enal 1122-82-3, Cyclohexyl
 isothiocyanate 1618-26-4, 2,4-Dithiapentane 3102-32-7,
 (Z)-Pent-3-en-2-one 3173-53-3, Cyclohexyl isocyanate 3658-80-8,
 Dimethyl trisulfide 4707-47-5, Methyl 2,4-dihydroxy-3,6-
 dimethylbenzoate 5756-24-1, Dimethyl tetrasulfide 24652-50-4,
 Pent-3-en-2-ol, (Z)- 32779-81-0 42474-44-2, 2,3,5-Trithiahexane
 51647-38-2 **85544-38-3**, 2,4,5,7-Tetrathiaoctane
 92353-11-2, Octen-3-ol 105633-23-6 155994-67-5,
 2,4,5,7,9-Pentathiadecane 185992-79-4 185992-80-7 185992-81-8
 (volatile **flavor** constituents of fresh *Marasmius alliaceus*)

L58 ANSWER 8 OF 13 HCA COPYRIGHT 2003 ACS

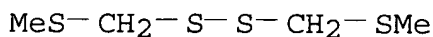
125:85203 A comparative study of the chemical composition of essential oils from *Scorodophloeus zenkere* Harms. and *Allium sativum* Linn. from Cameroon. Zollo, P. H. Amvam; Youngo, M. J. Dupon; Fekam, B. F.; Menut, C.; Lamaty, G.; Bessiere, J. M. (Lab. Phytobiochim., Fac. Sci., Yaounde, Cameroon). Rivista Italiana EPPOS, 7(Spec. Num.), 613-617 (French) 1996. CODEN: RIEPD7. ISSN: 0392-0445. Publisher: Rivista Italiana EPPOS.

AB In order to justify the name "garlic tree" which is given to a group of plants to which *S. zenkere* (Caesalpiniaceae) belongs, the authors distd. its essential oil and that of garlic (*A. sativum*). The extrn. of the essential oils was done by steam distn. of the stem bark of *S. zenkere* and bulbs of garlic. The *S. zenkere* oil contained 37.3% of alkanes, 29.3% of sulfur compds. and 0.6% of an arom. component unlike the oil of garlic which contained only 7.8% of alkanes but 90% of sulfur compds. These components are the cause of the **odor** which is almost similar to that of "garlic tree".

IT **85544-38-3**, Bis(methylthiomethyl) disulfide
 (compn. of oils from *Scorodophloeus zenkere* and *Allium sativum*)

RN 85544-38-3 HCA

CN Disulfide, bis[(methylthio)methyl] (9CI) (CA INDEX NAME)



CC 17-14 (Food and Feed Chemistry)
 Section cross-reference(s): 11

IT 2050-87-5, Diallyl trisulfide 2179-57-9, Diallyl disulfide
85544-38-3, Bis(methylthiomethyl) disulfide
 (compn. of oils from *Scorodophloeus zenkere* and *Allium sativum*)

L58 ANSWER 9 OF 13 HCA COPYRIGHT 2003 ACS

- 124:28537 **Flavor** studies on Fujian Lentinus edodes. Zheng, Jianxian; Ding, Xiaolin (South China Univ. of Technology, Peop. Rep. China). Wuxi Qinggong Daxue Xuebao, 14(2), 102-8 (Chinese) 1995. CODEN: WQDXF3. Publisher: Wuxi Qinggong Daxue Xuebao Bianjibu.
- AB Using simultaneous distn.-extn., the extd. volatile **flavor** compds. from fruit body (BG) and foot body (BJ) of Fujian Lentinus edodes were analyzed by GC/MS; 64 were isolated and 42 **flavor** compds. were identified. Anal. results showed that there were considerable differences of **flavor** compds. between BG and BJ, but the differences between chief compds. (sulfur and 8-carbons volatile) were not obvious. Among the sulfur compds. identified, 2 components were found for the first time.
- IT 38634-59-2
(**flavor** studies on Fujian Lentinus edodes)
- RN 38634-59-2 HCA
- CN Ethanethioic acid, S-[(methylthio)methyl] ester (9CI) (CA INDEX NAME)

AcS-CH₂-SMe

- CC 17-10 (Food and Feed Chemistry)
Section cross-reference(s): 11
- ST **flavor** compd Lentinus
- IT **Flavor**
Lentinula edodes
(**flavor** studies on Fujian Lentinus edodes)
- IT Alcohols, biological studies
Aldehydes, biological studies
Alkanes, biological studies
Alkenes, biological studies
Aromatic compounds
Carboxylic acids, biological studies
Cycloalkanes
Heterocyclic compounds
Ketones, biological studies
(**flavor** studies on Fujian Lentinus edodes)
- IT Alcohols, biological studies
Ethers, biological studies
(sulfur-contg.; **flavor** studies on Fujian Lentinus edodes)
- IT Heterocyclic compounds
(sulfur, **flavor** studies on Fujian Lentinus edodes)
- IT 2372-99-8, 1,3,5,7,9-Pentathiacyclodecane 38634-59-2
(**flavor** studies on Fujian Lentinus edodes)
- L58 ANSWER 10 OF 13 HCA COPYRIGHT 2003 ACS
- 117:169713 Thermally degraded thiamin. A potent source of interesting **flavor** compounds. Guentert, Matthias; Bruening, J.; Emberger, R.; Hopp, R.; Koepsel, M.; Surburg, H.; Werkhoff, P. (Res. Dep., Haarmann and Reimer GmbH, Holzminden, D-3450, Germany). ACS Symposium Series, 490(Flavor Precursors), 140-63 (English) 1992.

CODEN: ACSMC8. ISSN: 0097-6156.

AB Aq. solns. of thiamin-HCl with different concns. and different pH values were autoclaved for various times. The resulting **flavor** compds. were obtained by applying the simultaneous distn./extn. method according to Likens-Nickerson. The **flavor** conc. was pre-separated by medium-pressure liq. chromatog. on silica gel with a pentane-diethyl ether gradient. The different fractions were subsequently analyzed by capillary gas chromatog. (HRGC) and capillary gas chromatog.-mass spectrometry (HRGC/MS). Various unknown compds. were isolated by preparative capillary gas chromatog. from the very complex mixts. in microgram-quantities to elucidate their structures by IR, NMR, and mass spectrometry, and to check their **olfactory** properties. The compds. identified were used to explain the various degrading pathways of thermally treated thiamin. Their occurrence, formation, sensory impression, and spectroscopic data are discussed.

IT 29414-47-9

(of thiamin thermal decompn. **aroma** compds., pH in relation to)

RN 29414-47-9 HCA

CN Methanethiol, (methylthio)- (6CI, 7CI, 8CI, 9CI) (CA INDEX NAME)

HS-CH₂-S-CH₃

CC 17-2 (Food and Feed Chemistry)
Section cross-reference(s): 27, 28

ST **flavor** thiamin thermal decompn

IT **Flavor**

Odor and Odorous substances

(formation of, in thiamin thermal decompn., pH in relation to)

IT Ketones, biological studies

Sulfides, biological studies

Thiols, biological studies

(of thiamin thermal decompn. **aroma**, pH in relation to)

IT Thermal decomposition

(of thiamin, pathways and products of, **flavor** and pH in relation to)

IT Alcohols, compounds

(compds., of thiamin thermal decompn. **aroma**, pH in relation to)

IT 96-22-0, 3-Pentanone 107-87-9, 2-Pentanone 137-00-8,
5-(2-Hydroxyethyl)-4-methylthiazole 513-86-0, Acetoin 554-14-3,
2-Methylthiophene 600-14-6, 2,3-Pentanedione 624-92-0, Dimethyl
disulfide 625-33-2, 3-Penten-2-one 638-17-5, Thialdine
656-51-9 656-53-1, 5-(2-Acetoxyethyl)-4-methylthiazole 693-95-8,
4-Methylthiazole 764-37-4, (E)-3-Penten-1-ol 764-38-5,
(Z)-3-Penten-1-ol 873-64-3, 4,5-Dimethyl-2-ethylthiazole
1003-04-9, Dihydro-3(2H)-thiophenone 1003-90-3 1072-72-6,
4-Thianone 1124-11-4, Tetramethylpyrazine 1487-15-6,
2-Methyl-4,5-dihydrofuran 2527-76-6, 2-Methyl-3-thiophenethiol
3142-66-3, 3-Hydroxy-2-pentanone 3188-00-9 3581-91-7,

4,5-Dimethylthiazole 4610-02-0 5185-97-7, 4-Oxopentyl acetate
 5704-20-1, 2-Hydroxy-3-pentanone 7326-47-8 13623-11-5,
 2,4,5-Trimethylthiazole 13679-85-1 16238-20-3 17042-24-9,
 2-Mercapto-3-pentanone 17398-16-2, 2-Ethyl-3,5,6-trimethylpyrazine
 19090-03-0 20662-84-4, 2,4,5-Trimethyloxazole 22694-96-8
 23654-92-4, 3,5-Dimethyl-1,2,4-trithiolane 24653-75-6 26473-61-0
 26486-13-5 26486-19-1 26693-24-3, Kahweofuran 28588-74-1,
 2-Methyl-3-furanthiol 28588-75-2, Bis(2-methyl-3-furyl) disulfide
29414-47-9 31331-53-0, 1-Methylthioethanethiol
 31883-01-9, 5-Ethyl-4-methylthiazole 33121-10-7 34619-12-0,
 4-Mercapto-2-butanone 38325-25-6 40789-98-8 40990-29-2
 41763-99-9 50742-40-0 51647-36-0 54717-13-4 54717-14-5
 57067-01-3 57067-07-9 57067-25-1 60633-24-1,
 2,4,5-Trimethyl-3-thiazoline 62308-60-5 66735-69-1,
 1-Methylthio-3-pentanone 67411-25-0 67633-97-0,
 3-Mercapto-2-pentanone 69382-62-3, 1,1-Ethanedithiol 77214-04-1
 85196-66-3 87746-82-5, Chilenone A 88825-37-0 88825-38-1
 89712-89-0 90238-76-9, 3-Methyl-1,2-dithian-4-one 90731-56-9
 91265-97-3 98321-74-5 109537-56-6 113394-05-1, Chilenone B
 119209-96-0 123728-54-1, 1-Mercapto-3-pentanone 124619-95-0
 124619-96-1 134281-02-0 143764-27-6 143764-28-7 143764-29-8
 143764-30-1 143764-31-2 143764-32-3 143764-33-4 143764-34-5
 143764-35-6 143764-36-7

(of thiamin thermal decompn. **aroma** compds., pH in
 relation to)

IT 67-03-8, Thiamin hydrochloride
 (thermal decompn. of, **aroma** compds. formation in, pH in
 relation to)

L58 ANSWER 11 OF 13 HCA COPYRIGHT 2003 ACS

116:234139 Supercritical carbon dioxide extraction of onion
flavors and their analysis by gas chromatography-mass
 spectrometry. Sinha, Nirmal K.; Guyer, Daniel E.; Gage, Douglas A.;
 Lira, Carl T. (Dep. Agric. Eng., Michigan State Univ., East Lansing,
 MI, 48824, USA). Journal of Agricultural and Food Chemistry, 40(5),
 842-5 (English) 1992. CODEN: JAFCAU. ISSN: 0021-8561.

AB Extn. with supercrit. carbon dioxide (SC-CO₂) produced fresh
 onion-like **flavor** components from onions. Combined gas
 chromatog.-mass spectrometry anal. of SC-CO₂ onion ext. showed the
 presence of 28 sulfur-contg. compds., including diallyl
 thiosulfinate (or its isomer, di-1-propenyl thiosulfinate), Pr
 methanethiosulfonate, dithiin derivs., diallyl sulfide, diallyl
 trisulfide, and 6 other tentatively identified constituents. A com.
 steam-distd. onion oil analyzed under similar conditions did not
 contain detectable amts. of the compds. listed but did have 13 other
 compds. in common with the SC-CO₂ onion ext. The **flavor**
 compds. Me Pr trisulfide, di-Pr trisulfide, and di-Pr tetrasulfide
 were detected only in the com. steam-distd. onion oil and were
 present in high concn.

IT **6725-64-0**, Methanedithiol
 (of onion **flavor** extd. with supercrit. carbon dioxide)

RN 6725-64-0 HCA

CN Methanedithiol (6CI, 7CI, 8CI, 9CI) (CA INDEX NAME)

HS-CH₂-SH

CC 17-6 (Food and Feed Chemistry)

ST onion **flavor** extn carbon dioxide

IT Onion

(**flavor**, supercrit. carbon dioxide extn. and compn. of)

IT **Flavor**

(onion, supercrit. carbon dioxide extn. and compn. of)

IT 6028-61-1, Dipropyltrisulfide 17619-36-2, Methylpropyltrisulfide
33368-80-8 52687-98-6, Dipropyltetrasulfide

(of onion **flavor**)

IT 109-80-8, 1,3-Propanedithiol 132-65-0, Dibenzothiophene
539-86-6, Diallyl thiosulfinate 592-88-1, Diallyl sulfide
624-92-0, Dimethyldisulfide 629-19-6, Dipropyldisulfide
632-15-5, 3,4-Dimethylthiophene 1072-43-1, Methylthiirane
2050-87-5, Diallyltrisulfide 2179-60-4, Methylpropyldisulfide
3658-80-8, Dimethyltrisulfide 5756-24-1, Dimethyltetrasulfide
5905-46-4 5905-47-5, Methyl-1-propenyl disulfide **6725-64-0**
, Methanedithiol 13678-59-6, Methyl-5-methylfurylsulfide
20333-39-5, Methylethyldisulfide 24387-69-7 33368-79-5
62488-52-2, 1,4-Hexadiene-3-sulfenoic acid 62488-53-3,
3,4-Dihydro-3-vinyl-1,2-dithiin 62488-53-3, 1,5-Hexadiene-3-
sulfenethioic acid 79869-58-2, Propanethiol 126876-26-4
(of onion **flavor** extd. with supercrit. carbon dioxide)

IT 124-38-9, Carbon dioxide, biological studies
(supercrit., onion **flavor** extn. with)

L58 ANSWER 12 OF 13 HCA COPYRIGHT 2003 ACS

106:3940 Enzymic formation of volatile compounds in shiitake mushroom
(Lentinus edodes Sing.). Chen, Chu Chin; Liu, Su Er; Wu, Chung May;
Ho, Chi Tang (Food Ind. Res. Dev. Inst., Hsinchu, 30099, Peop. Rep.
China). ACS Symposium Series, 317(Biogener. Aromas), 176-83
(English) 1986. CODEN: ACSMC8. ISSN: 0097-6156.

AB Volatile compds. of shiitake mushroom are composed of C8 alcs. and S
compds. 1-Octen-3-ol [3391-86-4] and 2-octen-1-ol [22104-78-5]
are the major C8 compds. providing the mushroom character of
shiitake **aroma**. The characteristic sulfurous note of
shiitake is composed of cyclic S-compds., such as lenthionine
(1,2,3,5,6-pentathiepane) [292-46-6], 1,2,4,5-tetrathiane (C₂H₄S₄)
[291-22-5], and 1,2,4-trithiolane (C₂H₄S₃) [289-16-7]. Formation
of C8 compds. and S compds. results from enzymic activities during
rupture and(or) drying of the tissue. C8-compds. are formed
enzymically from linoleic acid [60-33-3]. The formation of S
compds. probably involves 2 processes, enzymic reactions of lentic
acid as substrate and nonenzymic polymn. of methylene disulfide.

IT **6725-64-0**

(of shiitake mushroom **flavor**)

RN 6725-64-0 HCA

CN Methanedithiol (6CI, 7CI, 8CI, 9CI) (CA INDEX NAME)

HS-CH₂-SH

- CC 17-6 (Food and Feed Chemistry)
Section cross-reference(s): 11
- ST shiitake mushroom **flavor**; sulfur compd mushroom **flavor**
- IT Lentinus edodes
(**flavor** compds. of)
- IT Sulfides, biological studies
(of shiitake mushroom **flavor**)
- IT **Flavor**
(of shiitake mushroom, compn. of)
- IT 66-25-1 74-93-1, biological studies 75-15-0, biological studies
106-68-3 111-87-5, biological studies 287-53-6 289-16-7
291-21-4 291-22-5 292-45-5 292-46-6, Lenthionine 589-98-0
624-92-0, Methyl disulfide 693-54-9 2363-89-5 3391-86-4
3658-80-8, Dimethyl trisulfide 4312-99-6 5756-24-1, Dimethyl
tetrasulfide 6251-26-9, Methyl hydrodisulfide **6725-64-0**
7704-34-9D, org. compds. 19901-14-5 22104-78-5 42474-44-2
81531-39-7 103439-78-7 103439-79-8 103439-80-1 105633-23-6
(of shiitake mushroom **flavor**)
- IT 60-33-3, Linoleic acid, biological studies
(shiitake mushroom **flavor** formation from)
- L58 ANSWER 13 OF 13 HCA COPYRIGHT 2003 ACS
- 105:132455 Identification of sulfurous compounds of Shiitake mushroom
(Lentinus edodes Sing.). Chen, Chu Chin; Ho, Chi Tang (Food Ind.
Res. and Dev. Inst., Hsinchu, 30099, Taiwan). Journal of
Agricultural and Food Chemistry, 34(5), 830-3 (English) 1986.
CODEN: JAFCAU. ISSN: 0021-8561.
- AB Volatile S compds. of Shiitake mushroom were extd. from the
homogenate of fresh mushrooms, fractionated by silica gel column
chromatog., and analyzed by capillary gas chromatog. (GC) and
GC-mass spectrometry. There were 18 noncyclic and cyclic S compds.
identified; 13 of 18 were reported for the 1st time as components of
Shiitake mushroom. Cyclic S compds. such as lenthionine (C₂H₄S₅,
1,2,3,5,6-pentathiepane) [292-46-6], 1,2,4,5-tetrathiane (C₂H₄S₄)
[291-22-5], 1,2,3,5-tetrathiane (C₂H₄S₄) [19901-14-5], and
1,2,4-trithiolane (C₂H₄S₃) [289-16-7] were the major S compds.
identified in the mushroom homogenate.
- IT **6725-64-0**
(of Lentinus edodes mushroom, **odor** in relation to)
- RN 6725-64-0 HCA
- CN Methanedithiol (6CI, 7CI, 8CI, 9CI) (CA INDEX NAME)

HS-CH₂-SH

- CC 17-10 (Food and Feed Chemistry)
- ST Lentinus mushroom **odor** sulfur compd

- IT **Odor and Odorous** substances
(of *Lentinus edodes* mushroom, sulfur compds. in)
- IT *Lentinus edodes*
(sulfur compds., of, **odor** in relation to)
- IT 74-93-1, biological studies 75-15-0, biological studies 287-53-6
289-16-7 291-21-4 291-22-5 292-45-5 292-46-6 624-92-0
3658-80-8 5756-24-1 6251-26-9 **6725-64-0** 19901-14-5
81531-39-7 103439-78-7 103439-79-8 103439-80-1
(of *Lentinus edodes* mushroom, **odor** in relation to)

=> d 159 1-28 ti

- L59 ANSWER 1 OF 28 HCA COPYRIGHT 2003 ACS
TI Production of volatiles from amino acid homopolymers by irradiation
- L59 ANSWER 2 OF 28 HCA COPYRIGHT 2003 ACS
TI Compn. including *Bacillus megaterium* for removal of fats, oils and grease and application from grease traps
- L59 ANSWER 3 OF 28 HCA COPYRIGHT 2003 ACS
TI Pesticide residues in the canadian market basket survey-1992 to 1996
- L59 ANSWER 4 OF 28 HCA COPYRIGHT 2003 ACS
TI Volatile compounds of dry-cured Iberian ham as affected by the length of the curing process
- L59 ANSWER 5 OF 28 HCA COPYRIGHT 2003 ACS
TI **Aroma**-Active Compounds in Kimchi during Fermentation
- L59 ANSWER 6 OF 28 HCA COPYRIGHT 2003 ACS
TI Organic volatiles from bacteria grown on **beef**
- L59 ANSWER 7 OF 28 HCA COPYRIGHT 2003 ACS
TI Volatile **flavor** compounds of Jinhua ham
- L59 ANSWER 8 OF 28 HCA COPYRIGHT 2003 ACS
TI Residue monitoring 1991
- L59 ANSWER 9 OF 28 HCA COPYRIGHT 2003 ACS
TI Food and Drug Administration pesticide program - residues in foods - 1990
- L59 ANSWER 10 OF 28 HCA COPYRIGHT 2003 ACS
TI Amounts of volatile sulfur compounds in the edible part of carp (*Cyprinus carpio*) fed different fat and .alpha.-tocopheryl acetate dietary supplements
- L59 ANSWER 11 OF 28 HCA COPYRIGHT 2003 ACS
TI Determination of volatile sulfur compounds in carp **meat**
- L59 ANSWER 12 OF 28 HCA COPYRIGHT 2003 ACS

- TI Volatile compounds associated with microbial growth on normal and high pH **beef** stored at chill temperatures
- L59 ANSWER 13 OF 28 HCA COPYRIGHT 2003 ACS
TI Effect of water on the production of cooked **beef** **aroma** compounds.
- L59 ANSWER 14 OF 28 HCA COPYRIGHT 2003 ACS
TI Pesticide residues in Danish food 1984 to 1985
- L59 ANSWER 15 OF 28 HCA COPYRIGHT 2003 ACS
TI Volatile compounds associated with the spoilage of normal and high pH vacuum-packed **pork**
- L59 ANSWER 16 OF 28 HCA COPYRIGHT 2003 ACS
TI Volatile sulfur-containing compounds in the products of the Maillard reaction obtained from acid and enzyme soybean hydrolyzates
- L59 ANSWER 17 OF 28 HCA COPYRIGHT 2003 ACS
TI The effect of heat on **beef aroma**: comparisons of chemical composition and sensory properties
- L59 ANSWER 18 OF 28 HCA COPYRIGHT 2003 ACS
TI Effect of water on the production of cooked **beef** **aroma** compounds
- L59 ANSWER 19 OF 28 HCA COPYRIGHT 2003 ACS
TI Capillary gas chromatography-mass spectrometric analysis of cooked ground **beef aroma**
- L59 ANSWER 20 OF 28 HCA COPYRIGHT 2003 ACS
TI Identification of sulfur-organic compounds obtained by thermal treatment of the **meat** broths in the presence of alkyl-mercaptopropanol
- L59 ANSWER 21 OF 28 HCA COPYRIGHT 2003 ACS
TI Identification of organosulfur compounds resulting from cooking **meat** broths in the presence of 2-methyl-3-mercapto-1-propanol
- L59 ANSWER 22 OF 28 HCA COPYRIGHT 2003 ACS
TI Volatile sulfur-containing compounds in simulated **meat** **flavor** and comparison of their composition with volatile compounds of natural boiled **beef**
- L59 ANSWER 23 OF 28 HCA COPYRIGHT 2003 ACS
TI Volatile sulfur-containing compounds in simulated **meat** **flavor** and their comparison with the constituents of natural **aroma**
- L59 ANSWER 24 OF 28 HCA COPYRIGHT 2003 ACS
TI Pesticide residues in the total diet in Canada. V: 1976 to 1978

- L59 ANSWER 25 OF 28 HCA COPYRIGHT 2003 ACS
TI Sulfur containing compounds in the volatile constituents of boiled meat
- L59 ANSWER 26 OF 28 HCA COPYRIGHT 2003 ACS
TI Nonacidic constituents of volatiles from cooked mutton
- L59 ANSWER 27 OF 28 HCA COPYRIGHT 2003 ACS
TI Survey of trace elements and pesticide residues in the New Zealand diet. 2. Organochlorine and organophosphorus pesticide residue content
- L59 ANSWER 28 OF 28 HCA COPYRIGHT 2003 ACS
TI Newer acaricides and insecticides in the control of ectoparasites of poultry

=> d 159 6,7,12,15,17,18,19,22,23,25,26 cbib abs hitstr hitind

- L59 ANSWER 6 OF 28 HCA COPYRIGHT 2003 ACS
122:30110 Organic volatiles from bacteria grown on **beef**.
Intarapichet, K.; Bailey, M.E. (Department of Agro-Industry, Prince of Songkla University, Songkhla, 90110, Thailand). Thai Journal of Agricultural Science, 25(4), 299-326 (English) 1992. CODEN: TJASBN. ISSN: 0049-3589.
- AB Ninety four bacterial isolates were recovered from spoiled com. ground **beef** stored at 4.degree.C for 14 days. These isolates included 20% gram-pos. rods and cocci; 2% Lactobacillus, 2% Brochothrix thermosphacta and 14% Lactococcus, and 80% gram-neg. rods; 21% fluorescent pseudomonads, 56% non-fluorescent pseudomonads; 1% Moraxella and 1% Citrobacter. A representative isolate from each of Lactococcus, B. thermosphacta and Pseudomonas fluorescens and 3 isolates from non-fluorescent pseudomonads along with ref. cultures were grown on sterile **beef** at 4.degree.C for 14 days. Volative compds. produced during microbial spoilage were collected on a Tenax GC trap and subsequently identified by direct sampling GLC-MS. One hundred and eighty six compds. were identified including acids, alcs., aldehydes, esters, hydrocarbons, ketones, nitrogen-contg. compds., sulfur-contg. compds., chlorinated compds. and others. Spoilage organisms were characterized by predictor volatiles from GLC profiles using discriminant and canonical discriminant anal.
- IT 1618-26-4, 2,4-Dithiapentane
(volatiles from bacteria grown on **beef**)
- RN 1618-26-4 HCA
- CN Methane, bis(methylthio)- (6CI, 7CI, 8CI, 9CI) (CA INDEX NAME)



CC 17-7 (Food and Feed Chemistry)

Section cross-reference(s): 10

ST **beef** spoilage bacteria volatile compd; **odor**
beef bacteria

IT Brochothrix thermosphacta
Lactobacillus
Pseudomonadaceae
Pseudomonas fluorescens
(volatiles from bacteria grown on **beef**)

IT Alcohols, biological studies
Aldehydes, biological studies
Alkanes, biological studies
Esters, biological studies
Ketones, biological studies
(volatiles from bacteria grown on **beef**)

IT **Meat**
(**beef**, volatiles from bacteria grown on **beef**)

IT **Flavor**
Odor and Odorous substances
(off-, volatiles from bacteria grown on **beef**)

IT Organic compounds, biological studies
(sulfur-contg., volatiles from bacteria grown on **beef**)

IT 64-17-5, Ethanol, biological studies 64-19-7, Acetic acid,
biological studies 66-25-1, Hexanal 67-63-0, 2-Propanol,
biological studies 67-64-1, 2-Propanone, biological studies
71-23-8, 1-Propanol, biological studies 71-36-3, 1-Butanol,
biological studies 71-41-0, 1-Pentanol, biological studies
71-43-2, Benzene, biological studies 74-93-1, Methanethiol,
biological studies 75-18-3, Dimethylsulfide 75-50-3,
Trimethylamine, biological studies 78-83-1, 2-Methyl-1-propanol,
biological studies 78-84-2, 2-Methylpropanal 78-92-2, 2-Butanol
78-93-3, 2-Butanone, biological studies 79-20-9, Methyl acetate
84-66-2, Diethylphthalate 95-16-9, Benzothiazole 96-04-8,
2,3-Heptanedione 96-14-0, 3-Methylpentane 96-17-3,
2-Methylbutanal 96-37-7, Methylcyclopentane 98-01-1,
Furaldehyde, biological studies 98-83-9, Methyl styrene,
biological studies 100-41-4, Ethylbenzene, biological studies
100-42-5, biological studies 100-52-7, Benzaldehyde, biological
studies 100-66-3, Methoxybenzene, biological studies 100-73-2,
3,4-Dihydro-2H-pyran-2-carboxaldehyde 104-61-0,
.gamma.-Nonalactone 106-35-4, 3-Heptanone 106-68-3, 3-Octanone
106-97-8, Butane, biological studies 107-83-5, 2-Methylpentane
107-87-9, 2-Pentanone 108-08-7, 2,4-Dimethylpentane 108-10-1,
4-Methyl-2-pentanone 108-82-7, 2,6-Dimethyl-4-heptanol 108-88-3,
Methylbenzene, biological studies 108-93-0, Cyclohexanol,
biological studies 108-94-1, Cyclohexanone, biological studies
109-08-0, Methylpyrazine 109-21-7, Butyl butanoate 109-66-0,
Pentane, biological studies 110-02-1, Thiophene 110-43-0,
2-Heptanone 110-54-3, Hexane, biological studies 110-62-3,
Pentanal 110-86-1, Pyridine, biological studies 110-87-2
111-13-7, 2-Octanone 111-27-3, 1-Hexanol, biological studies
111-65-9, Octane, biological studies 111-70-6, 1-Heptanol
111-71-7, Heptanal 111-76-2, 2-Butoxyethanol 111-84-2, Nonane

111-87-5, 1-Octanol, biological studies 112-12-9, 2-Undecanone
 112-31-2, Decanal 112-40-3, Dodecane 112-41-4, 1-Dodecene
 112-44-7, Undecanal 112-54-9, Dodecanal 115-18-4,
 2-Methyl-3-buten-2-ol 122-39-4, biological studies 122-78-1,
 Benzeneacetaldehyde 123-19-3, 4-Heptanone 123-32-0,
 2,5-Dimethylpyrazine 123-51-3, 3-Methyl-1-butanol 124-07-2,
 Octanoic acid, biological studies 124-11-8, 1-Nonene 124-13-0,
 Octanal 124-18-5, Decane 124-19-6, Nonanal 124-25-4,
 Tetradecanal 128-37-0, 2,6-Bis(1,1-dimethylethyl)-4-methylphenol,
 biological studies 137-32-6, 2-Methyl-1-butanol 138-86-3,
 Limonene 141-78-6, Ethyl acetate, biological studies 142-29-0,
 Cyclopentene 142-82-5, Heptane, biological studies 275-51-4,
 Azulene 290-37-9, Pyrazine 420-12-2, Ethylene sulfide
 431-03-8, 2,3-Butanedione 505-57-7, 2-Hexenal 508-32-7,
 Tricyclene 513-53-1, 2-Butanethiol 513-85-9, 2,3-Butanediol
 513-86-0, 3-Hydroxy-2-butanone 539-82-2, Ethyl pentanoate
 543-49-7, 2-Heptanol 544-76-3, Hexadecane 557-17-5,
 1-Methoxypropane 563-80-4, 3-Methyl-2-butanone 565-61-7,
 3-Methyl-2-pentanone 585-25-1, 2,3-Octanedione 589-34-4,
 3-Methylhexane 589-38-8, 3-Hexanone 589-43-5, 2,4-Dimethylhexane
 589-81-1, 3-Methylheptane 590-86-3, 3-Methylbutanal 591-76-4,
 2-Methylhexane 591-78-6, 2-Hexanone 592-41-6, 1-Hexene,
 biological studies 600-36-2, 2,4-Dimethyl-3-pentanol 611-14-3,
 1-Ethyl-2-methyl benzene 624-41-9 624-92-0, Dimethyldisulfide
 627-02-1, 1-Ethoxy-2-methylpropane 628-92-2, Cycloheptene
 629-50-5, Tridecane 629-59-4, Tetradecane 629-62-9, Pentadecane
 629-78-7, Heptadecane 638-37-9, Butanedial 659-70-1,
 3-Methylbutyl 3-methylbutyrate 695-12-5, Ethenylcyclohexane
 760-20-3, 3-Methyl-1-pentene 763-32-6 763-88-2,
 5-Methyl-1,4-hexadiene 821-55-6, 2-Nonanone 821-95-4, 1-Undecene
 823-76-7 923-28-4, 2-Methyl-3-octanone 1120-21-4, Undecane
 1124-11-4, Tetramethylpyrazine 1330-20-7, Dimethylbenzene,
 biological studies 1534-08-3 **1618-26-4**,
 2,4-Dithiapentane 1633-97-2, 2-Methyl-2-pentanethiol 2050-01-3,
 3-Methylbutyl isobutyrate 2084-19-7, 2-Pentanethiol 2175-91-9
 2198-23-4, 4-Nonene 2363-88-4, 2,4-Decadienal 2363-89-5,
 2-Octenal 2384-90-9, 1,2-Heptadiene 2445-69-4, 2-Methylbutyl
 isobutyrate 2445-77-4, 2-Methylbutyl 3-methylbutyrate 2463-53-8,
 2-Nonenal 2463-77-6, 2-Undecenal 2922-51-2, 2-Heptadecanone
 3070-53-9, 1,6-Heptadiene 3382-61-4, 1,3-Nonadiene 3391-86-4,
 1-Octen-3-ol 3521-91-3, 1-Hepten-4-ol 3658-80-8,
 Dimethyltrisulfide 3877-15-4, 1-(Methylthio)propane 3913-71-1,
 2-Decenal 4170-30-3, 2-Butenal 4938-52-7, 1-Hepten-3-ol
 5204-80-8, 2-Ethyl-4-pentenal 5343-96-4, 1,2-Dimethylpropyl
 acetate 5910-89-4, 2,3-Dimethylpyrazine 6032-29-7, 2-Pentanol
 6628-18-8, 1,2-Bis(methylthio)ethane 6714-00-7, 5-Hepten-2-one
 6750-03-4, 2,4-Nonadienal 10486-19-8, Tridecanal 13151-06-9,
 7-Methyl-1-octene 13925-00-3, Ethylpyrazine 14287-61-7
 14667-55-1, Trimethylpyrazine 17094-21-2, Methyl
 2-methyl-3-ketobutyrate 20662-84-4, Trimethyloxazole 25551-13-7,
 Trimethylbenzene 34976-17-5 38284-27-4, 3,5-Octadien-2-one
 53778-43-1 53786-93-9, 1,4-Undecadiene 53897-51-1 64743-39-1

65221-09-2 74806-04-5, Carene 159885-52-6
(volatiles from bacteria grown on beef)

L59 ANSWER 7 OF 28 HCA COPYRIGHT 2003 ACS

119:70979 Volatile **flavor** compounds of Jinhua ham. Zhu, Shangwu; Yang, Yaohuan; Wang, Xiyuan; Lin, Kezhong; Hu, Jiabin; Zhao, Xiaoning; Zhang, Shaohua; Bu, Xinpei (Hangzhou Inst. Commer., Hangzhou, 310035, Peop. Rep. China). Shipin Kexue (Beijing, China), 158, 16-17 (Chinese) 1993. CODEN: SPKHD5. ISSN: 0253-8997.

AB Volatile **flavor** components were sep'd. from Jinhua ham by steam distn. The distillate was extd. by ether, then conc'd. by volatilizing the ether. Forty-eight components were isolated and identified from the conc. by gas chromatog.-mass spectrometry, including alkanes, alcs., aldehydes, ketones, alkenes, acids, and esters. Most of them were identified from Jinhua ham for the first time.

IT 6317-18-6
(of ham, from Jinhua, China)

RN 6317-18-6 HCA

CN Thiocyanic acid, methylene ester (6CI, 7CI, 8CI, 9CI) (CA INDEX NAME)

NC- S- CH₂- S- CN

CC 17-7 (Food and Feed Chemistry)

ST ham **flavor** volatile Jinhua

IT **Flavor**

Alcohols, biological studies

Aldehydes, biological studies

Alkanes, biological studies

Alkenes, biological studies

Esters, biological studies

Ketones, biological studies

(of ham, from Jinhua, China)

IT **Meat**

(ham, volatile **flavor** components of, of Jinhua, China)

IT 57-10-3, Hexadecanoic acid, biological studies 60-12-8, Phenylethanol 64-19-7, Acetic acid, biological studies 75-07-0, Acetaldehyde, biological studies 76-22-2 95-14-7, 1H-Benzotriazole 96-17-3 100-52-7, Phenylformaldehyde, biological studies 103-70-8, N-Phenyl-formamide 105-54-4, Ethyl butanoate 105-57-7, 1,1-Diethoxy-ethane 111-15-9, 2-Ethoxyethyl acetate 111-65-9, Octane, biological studies 112-40-3, Dodecane 112-95-8, Eicosane 122-78-1, Phenylacetaldehyde 123-25-1, Diethyl succinate 124-18-5, Decane 141-78-6, Ethyl acetate, biological studies 141-82-2, Malonic acid, biological studies 544-63-8, Tetradecanoic acid, biological studies 544-76-3, Hexadecane 590-86-3 593-45-3, Octadecane 629-59-4, Tetradecane 629-62-9, Pentadecane 629-78-7, Heptadecane 629-80-1, Hexadecanal 629-92-5, Nonadecane 766-20-1 939-48-0, Isopropyl benzoate 4429-77-0, Cycloheptadecanol 5405-41-4, Ethyl

3-hydroxybutanoate 5702-49-8, 2-Isopropyl-1,3-dioxane
 6317-18-6 10312-83-1, Methoxyacetaldehyde 10486-19-8,
 Tridecanal 13091-16-2 19377-95-8 53957-26-9 55000-52-7,
 2,6,10-Trimethylhexadecane 76086-05-0 94135-93-0 122694-34-2,
 Propenethiol

(of ham, from Jinhua, China)

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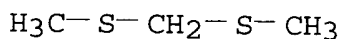
111:113947 Volatile compounds associated with microbial growth on normal and high pH **beef** stored at chill temperatures. Dainty, R. H.; Edwards, R. A.; Hibbard, C. M.; Marnewick, J. J. (Inst. Food Res., Agric. and Food Res. Counc., Langford/Bristol, BS18 7DY, UK). Journal of Applied Bacteriology, 66(4), 281-9 (English) 1989. CODEN: JABAA4. ISSN: 0021-8847.

AB Volatile compds. produced by *Pseudomonas fragi* and mixed, natural floras on **beef** of normal pH (5.5-5.8; glucose > 1500 .mu.g/g) and high pH (6.3-6.8; glucose <10 .mu.g/g) included a range of alkyl esters and a no. of S-contg. compds. including Me2S but not H2S. Prodn. of H2S was a property common to the other gram-neg. organisms tested viz. *Hafnia alvei*, *Enterobacter agglomerans*, *Serratia liquefaciens*, *Alteromonas putrefaciens*, and *Aeromonas hydrophila*, all of which produced similar off-odors and, with the exception of *E. agglomerans*, "greening" on high pH **meat**. *S. liquefaciens* also produced greening of normal pH **meat**. Acetoin and diacetyl were major end products of *Brochothrix thermosphacta* but the related 2,3-butanediol was formed only on normal pH **meat**. The *Enterobacteriaceae* produced the same compds. but only on normal pH **meat** and together with *B. thermosphacta* were probable sources of these compds. and of the free and esterified branched-chain alcs. detected in the naturally contaminated samples.

IT 1618-26-4, Bis(methylthio)methane
 (formation of, in **beef** bacterial spoilage, pH in relation to)

RN 1618-26-4 HCA

CN Methane, bis(methylthio)- (6CI, 7CI, 8CI, 9CI) (CA INDEX NAME)



CC 17-7 (Food and Feed Chemistry)
 Section cross-reference(s): 10

ST **beef** bacteria spoilage pH; **odor beef**
 spoilage bacteria; alc **beef** spoilage **odor**

IT *Aeromonas hydrophila*
Alteromonas putrefaciens
Brochothrix thermosphacta
Enterobacter agglomerans
Enterobacter hafniae
Pseudomonas fragi
Serratia liquefaciens
 (beef spoilage by, odor formation in, pH in

- relation to)
- IT Alcohols, biological studies
Esters, biological studies
Sulfides, biological studies
(formation of, in **beef** bacterial spoilage, pH in relation to)
- IT Odor and Odorous substances
(of **beef** bacterial spoilage, pH in relation to)
- IT Meat
(**beef**, bacterial spoilage of, odor formation in, pH in relation to)
- IT Bacteria
(gram-neg., **beef** spoilage by, odor formation in, pH in relation to)
- IT 64-17-5, Ethanol, biological studies 71-23-8, Propanol, biological studies 74-93-1, Methanethiol, biological studies 75-18-3, Dimethyl sulfide 78-83-1, biological studies 97-62-1, Ethyl isobutyrate 105-37-3, Ethyl propionate 105-79-3, Isobutyl hexanoate 106-30-9, Ethyl heptanoate 106-32-1, Ethyl octanoate 108-21-4, Isopropyl acetate 108-64-5, Ethyl 3-methylbutyrate 110-19-0, Isobutyl acetate 123-51-3 123-66-0, Ethyl hexanoate 123-92-2, Isoamyl acetate 137-32-6 141-78-6, Ethyl acetate, biological studies 431-03-8, Diacetyl 513-85-9, 2,3-Butanediol 513-86-0, Acetoin 540-42-1, Isobutyl propionate 590-86-3, Isovaleraldehyde 624-92-0, Dimethyl disulfide 638-10-8, Ethyl 3-methyl-2-butenate 821-95-4, 1-Undecene 1534-08-3 1618-26-4, Bis(methylthio)methane 3658-80-8, Dimethyl trisulfide 5675-22-9, 1,4-Heptadiene 5925-75-7 7452-79-1, Ethyl 2-methylbutyrate 7783-06-4, Hydrogen sulfide, biological studies 10544-63-5, Ethyl crotonate 53786-93-9, 1,4-Undecadiene 61692-84-0, Isobutyl tiglate
(formation of, in **beef** bacterial spoilage, pH in relation to)
- L59 ANSWER 15 OF 28 HCA COPYRIGHT 2003 ACS
- 107:38263 Volatile compounds associated with the spoilage of normal and high pH vacuum-packed **pork**. Edwards, Robert A.; Dainty, Richard H. (Inst. Food Res., Agric. Food Res. Counc., Langford/Bristol, BS18 7DY, UK). Journal of the Science of Food and Agriculture, 38(1), 57-66 (English) 1987. CODEN: JSFAAE. ISSN: 0022-5142.
- AB **Pork** of normal (5.5-5.6) and high (6.3-6.6) pH was stored in vacuum packs at 5.degree.C until spoiled. At spoilage the bacterial flora of the normal pH **meat** was dominated by lactic acid bacteria, that of the high pH **meat** by gram-neg. organisms. Volatile compds. in the packs were analyzed by a headspace entrainment technique and gas chromatog.-mass spectrometry. Major differences between the two types of **meat** were confined mainly to a series of S-contg. compds. which were more numerous, and present in high concns. in the headspaces above high pH **meat**.
- IT 1618-26-4

(of **pork** in spoilage, **meat** pH effect on)

RN 1618-26-4 HCA

CN Methane, bis(methylthio)- (6CI, 7CI, 8CI, 9CI) (CA INDEX NAME)



CC 17-7 (Food and Feed Chemistry)

ST **pork** spoilage **odor** compd

IT **Odor** and **Odorous** substances

(formation of, in **pork** in spoilage, **meat** pH effect on)

IT Alcohols, biological studies

Aldehydes, biological studies

Hydrocarbons, biological studies

(of **pork** in spoilage, **meat** pH effect on)

IT **Meat**

(**pork**, spoilage of, **odor** compds. formation in, **meat** pH effect on)

IT 66-25-1, n-Hexanal 71-36-3, n-Butanol, biological studies
 71-41-0, n-Pentanol, biological studies 74-93-1, biological studies
 78-83-1, 2-Methyl-1-propanol, biological studies
 95-47-6, biological studies 100-41-4, Ethyl benzene, biological studies
 105-37-3 106-42-3, biological studies 108-38-3, m-Xylene, biological studies
 108-64-5 108-88-3, biological studies 109-60-4 111-65-9, n-Octane, biological studies
 111-71-7, n-Heptanal 111-84-2, n-Nonane 112-40-3, n-Dodecane
 123-51-3, 3-Methyl-1-butanol 124-13-0, n-Octanal 124-18-5, n-Decane
 124-19-6, n-Nonanal 141-78-6, biological studies 431-03-8, Diacetyl
 513-86-0, Acetoin 590-86-3, Isovaleraldehyde 624-92-0 1120-21-4, n-Undecane
1618-26-4 2444-37-3 3658-80-8 7783-06-4, biological studies 25377-83-7, Octene
 27215-95-8, Nonene 109145-20-2
 (of **pork** in spoilage, **meat** pH effect on)

L59 ANSWER 17 OF 28 HCA COPYRIGHT 2003 ACS

107:5922 The effect of heat on **beef** **aroma**:

comparisons of chemical composition and sensory properties. MacLeod, Glesni; Ames, Jennifer M. (Dep. Food Nutr. Sci., King's Coll. London, London, W8 7AH, UK). Flavour and Fragrance Journal, 1(3), 91-104 (English) 1986. CODEN: FFJOED. ISSN: 0882-5734.

AB **Aroma** volatiles of fresh cooked ground **beef**

subjected to varying degrees of heating were adsorbed on to the adsorbent Tenax TA, and the desorbed **aromas** analyzed sensorially and chem. Several of the components identified by combined capillary gas chromatog.-mass spectrometry have not been reported previously from heated **beef**. Data is presented to support the generalization that the higher the degree of heating, the greater the concns. of aliph. aldehydes (esp. Strecker aldehydes), benzenoids, aliph. polysulfides, heterocyclic compds. and lipid-derived volatiles, whereas smaller contributions to the isolates arise from aliph. ketones and alcs. (of non-lipid origin)

and aliph. mono-sulfur components. By sensory anal., eight of **odor** qualities were frequently used during gas chromatog. **odor** port assessment, namely buttery, caramel, burnt, green, **fragrant**, oily/fatty, nutty and **meaty**. Components assocd. with the former seven qualities are **aroma** modifiers whereas compds. contributing **meaty** quality are character impact compds., e.g. 2-methyl-3-(methylthio)furan and 3-methylcyclopentanone. Addnl., several unsatd. alicyclic ketones were present which resemble the cyclohexenones previously known to be significant in **meat aroma**.

IT 1618-26-4
 (of cooked **beef odor**)
 RN 1618-26-4 HCA
 CN Methane, bis(methylthio)- (6CI, 7CI, 8CI, 9CI) (CA INDEX NAME)



CC 17-7 (Food and Feed Chemistry)
 ST cooked **beef odor** compd
 IT Alcohols, biological studies
 Aldehydes, biological studies
 Esters, biological studies
 Heterocyclic compounds
 Hydrocarbons, biological studies
 Ketones, biological studies
 Polysulfides
 Terpenes and Terpenoids, biological studies
 (of cooked **beef odor**)
 IT **Flavor**
 Odor and Odorous substances
 (of cooked **beef**, heat effect on)
 IT **Meat**
 (beef, cooked, **flavor** compds. of)
 IT 60-29-7, Diethyl ether, biological studies 64-17-5, Ethanol, biological studies 64-19-7, Acetic acid, biological studies 66-25-1, Hexanal 67-56-1, biological studies 67-63-0, Propan-2-ol, biological studies 67-64-1, Acetone, biological studies 67-71-0, Dimethyl sulfone 71-23-8, Propan-1-ol, biological studies 71-36-3, biological studies 71-41-0, Pentan-1-ol, biological studies 71-43-2, biological studies 71-43-2D, alkyl derivs. 74-93-1, Methanethiol, biological studies 75-07-0, Acetaldehyde, biological studies 75-15-0, Carbon disulfide, biological studies 75-18-3, Dimethyl sulfide 75-28-5 75-50-3, Trimethylamine, biological studies 75-65-0, 2-Methylpropan-2-ol, biological studies 75-85-4, 2-Methylbutan-2-ol 76-22-2, Camphor 78-78-4 78-83-1, 2-Methylpropan-1-ol, biological studies 78-84-2, Methylpropanal 78-92-2, Butan-2-ol 78-93-3, Butanone, biological studies 79-09-4, Propanoic acid, biological studies 79-20-9, Methyl acetate 91-20-3, Naphthalene, biological studies 95-13-6, Indene 96-14-0, 3-Methylpentane 96-17-3, 2-Methylbutanal 96-22-0,

Pentan-3-one 96-37-7, Methylcyclopentane 96-48-0 98-00-0,
2-Furanmethanol 98-01-1, Furfural, biological studies 98-86-2,
Acetophenone, biological studies 100-41-4, Ethylbenzene,
biological studies 100-42-5, biological studies 100-43-6,
4-Vinylpyridine 100-52-7, Benzaldehyde, biological studies
100-71-0, 2-Ethylpyridine 101-41-7, Methyl phenylacetate
103-65-1, Propylbenzene 104-50-7 106-35-4, Heptan-3-one
106-70-7, Methyl hexanoate 106-97-8, Butane, biological studies
107-02-8, biological studies 107-03-9, Propane-1-thiol 107-83-5,
2-Methylpentane 107-87-9, Pentan-2-one 107-92-6, Butanoic acid,
biological studies 108-10-1, 4-Methylpentan-2-one 108-50-9,
2,6-Dimethylpyrazine 108-88-3, biological studies 108-90-7,
Chlorobenzene, biological studies 108-94-1, Cyclohexanone,
biological studies 108-95-2, Phenol, biological studies
109-08-0, Methylpyrazine 109-52-4, Pentanoic acid, biological
studies 109-66-0, Pentane, biological studies 109-92-2, Ethyl
vinyl ether 109-94-4, Ethyl formate 109-97-7, Pyrrole
109-99-9, Tetrahydrofuran, biological studies 110-00-9, Furan
110-02-1, Thiophen 110-12-3, 5-Methylhexan-2-one 110-43-0,
Heptan-2-one 110-54-3, Hexane, biological studies 110-62-3,
Pentanal 110-80-5 110-82-7, Cyclohexane, biological studies
110-86-1, Pyridine, biological studies 111-13-7, Octan-2-one
111-27-3, biological studies 111-65-9, Octane, biological studies
111-70-6, Heptan-1-ol 111-71-7, Heptanal 111-84-2, Nonane
111-87-5, Octan-1-ol, biological studies 112-12-9, Undecan-2-one
112-31-2, Decanal 112-40-3, Dodecane 112-41-4, Dodec-1-ene
115-11-7, biological studies 116-09-6, Hydroxypropanone
120-92-3, Cyclopentanone 122-78-1, Phenylacetaldehyde 123-32-0,
2,5-Dimethylpyrazine 123-38-6, Propanal, biological studies
123-51-3, 3-Methylbutan-1-ol 123-54-6, Pentane-2,4-dione,
biological studies 123-72-8, Butanal 124-13-0, Octanal
124-18-5, Decane 124-19-6, Nonanal 124-38-9, Carbon dioxide,
biological studies 137-32-6, 2-Methylbutan-1-ol 141-78-6, Ethyl
acetate, biological studies 142-82-5, Heptane, biological studies
143-08-8, Nonan-1-ol 287-27-4 288-47-1, Thiazole 290-37-9,
Pyrazine 290-37-9D, Pyrazine, alkyl derivs. 420-12-2 431-03-8,
Diacyetyl 463-58-1, Carbonyl sulfide 504-60-9, Penta-1,3-diene
513-86-0 534-22-5, 2-Methylfuran 536-78-7, 3-Ethylpyridine
540-67-0, Ethyl methyl ether 554-12-1, Methyl propanoate
554-14-3 556-82-1 563-80-4 565-61-7, 3-Methylpentan-2-one
585-25-1D, Octane-2,3-dione, derivs. 589-38-8, Hexan-3-one
590-86-3, 3-Methylbutanal 591-78-6, Hexan-2-one 592-27-8
600-14-6, Pentane-2,3-dione 616-25-1, Pent-1-en-3-ol 623-36-9,
2-Methylpent-2-enal 624-89-5, Ethyl methyl sulfide 624-92-0,
Dimethyl disulfide 625-33-2, Pent-3-en-2-one 629-50-5, Tridecane
636-41-9, 2-Methylpyrrole 638-02-8 693-54-9, Decan-2-one
693-95-8, 4-Methylthiazole 696-29-7, Isopropylcyclohexane
763-32-6, 3-Methylbut-3-en-1-ol 821-55-6, Nonan-2-one 824-22-6,
4-Methylindan 874-35-1, 5-Methylindan 929-20-4, 1,3,6-Octatriene
932-16-1, 2-Acetyl-1-methylpyrrole 1072-83-9, 2-Acetylpyrrole
1115-11-3 1120-21-4, Undecane 1120-72-5, 2-Methylcyclopentanone
1120-73-6, 2-Methylcyclopent-2-enone 1121-55-7, 3-Vinylpyridine

1122-62-9, 2-Acetylpyridine 1124-11-4, Tetramethylpyrazine
 1192-62-7, 2-Acetylfuran 1330-20-7D, Xylene, derivs. 1333-41-1D,
 Methylpyridine, derivs. 1335-39-3D, Hexenal, derivs. 1534-08-3
 1618-26-4 1629-58-9, Pent-1-en-3-one 1678-92-8, Propyl
 cyclohexane 1757-42-2, 3-Methylcyclopentanone 2039-90-9,
 2,6-Dimethylstyrene 2040-95-1, Butylcyclopentane 2179-60-4,
 Methyl propyl disulfide 2346-00-1, 2-Methyl-2-thiazoline
 3188-00-9, 2-Methyltetrahydrofuran-3-one 3391-86-4, Oct-1-en-3-ol
 3581-89-3, 5-Methylthiazole 3658-80-8, Dimethyl trisulfide
 3777-69-3, 2-Pentylfuran 3777-71-7, 2-Heptylfuran 3877-15-4,
 Methyl propyl sulfide 4170-30-3, Crotonal 4177-16-6,
 Vinylpyrazine 4229-91-8, 2-Propylfuran 4675-87-0,
 2-Methylbut-2-en-1-ol 5910-85-0, Hepta-2,4-dienal 5910-89-4,
 2,3-Dimethylpyrazine 5989-27-5 7446-09-5, Sulfur dioxide,
 biological studies 7783-06-4, Hydrogen sulfide, biological studies
 13360-64-0, 2-Ethyl-5-methylpyrazine 13360-65-1,
 2,5-Dimethyl-3-ethylpyrazine 13925-00-3, Ethylpyrazine
 13925-03-6, 2-Ethyl-6-methylpyrazine 13925-08-1,
 2-Methyl-5-vinylpyrazine 13925-09-2, 2-Methyl-6-vinylpyrazine
 14667-55-1, Trimethylpyrazine 15707-23-0, 2-Ethyl-3-methylpyrazine
 17398-16-2, 2-Ethyl-3,5,6-trimethylpyrazine 18138-04-0,
 2,3-Diethyl-5-methylpyrazine 18138-05-1, 2,6-Diethyl-3-
 methylpyrazine 20548-00-9 20662-84-4, 2,4,5-Trimethyloxazole
 23747-47-9, 6,7-Dihydro-(5H)cyclopentapyrazine 23747-48-0
 24295-03-2, 2-Acetylthiazole 25321-22-6, Dichlorobenzene
 25377-83-7D, Octene, derivs. 27175-64-0 27417-39-6D,
 Methylpyrrole, derivs. 29036-25-7D, Methylindene, derivs.
 29926-41-8, 2-Acetyl-2-thiazoline 32736-91-7, 2,5-Diethyl-3-
 methylpyrazine 34314-83-5, 4-Methyl-2,3-dihydrofuran 50888-63-6,
 2-Butyl-3,5-dimethylpyrazine 53563-67-0D, Dimethylindan, derivs.
 62488-56-6D, Nona-2,4-dienol, derivs. 63012-97-5,
 2-Methyl-3-(methylthio)furan 82000-05-3D, derivs. 87250-91-7
 104638-11-1 108653-51-6
 (of cooked **beef** odor)

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106:212705 Effect of water on the production of cooked **beef**

aroma compounds. Leod, Glesni Mac; Ames, Jennifer M. (Dep.
 Food Nutr. Sci., King's Coll. London, London, W8 7AH, UK). Journal
 of Food Science, 52(1), 42-5, 56 (English) 1987. CODEN: JFDSAZ.
 ISSN: 0022-1147.

AB **Aroma** compds. isolated from cooked fresh ground
beef, freeze-dried, defatted and dehydrated to 58% and 17%
 water, resp., were less **meaty** and contained higher
 relative concns. of hydrocarbons, ketones, lactones, esters,
 benzenoids, pyrroles, pyridines, and thiazol(in)es (58% H2O), and of
 aliph. ketones, lactones, esters, aliph. S compds., pyrroles, and
 pyrazines (17% H2O) than those obtained from untreated **beef**
 . Max. prodn. of volatiles did not occur at water activity
 (aw).apprx.0.7, as described previously for a model simulated
meat flavor system. Components probably
 contributing to the **meatier aroma** analyzed from

untreated **beef** were 2-methyl-3-(methylthio)furan [590-86-3], 3-methylcyclopentanone [1120-73-6], 2-methylcyclopentanone [1120-72-5], cyclopent-2-enones, and cyclohex-2-enones.

IT 1618-26-4
 (of cooked **beef** aroma, water activity effect on)
 RN 1618-26-4 HCA
 CN Methane, bis(methylthio)- (6CI, 7CI, 8CI, 9CI) (CA INDEX NAME)



CC 17-7 (Food and Feed Chemistry)
 ST **aroma** cooked **beef** water
 IT Alcohols, biological studies
 Aldehydes, biological studies
 Alkanes, biological studies
 Alkenes, biological studies
 Aromatic hydrocarbons, biological studies
 Carboxylic acids, biological studies
 Esters, biological studies
 Ketones, biological studies
 Sulfides, biological studies
 Terpenes and Terpenoids, biological studies
 (of cooked **beef** aroma, water activity effect on)
 IT **Flavor**
 (of cooked **beef**, water activity effect on)
 IT Hydrocarbons, biological studies
 (alicyclic, of cooked **beef** aroma, water activity effect on)
 IT **Meat**
 (**beef**, **flavor** of cooked, water activity effect on)
 IT 7732-18-5, Water, biological studies
 (activity of, of cooked **beef**, **flavor** response to)
 IT 60-29-7, Ether, biological studies 64-17-5, Ethanol, biological studies 64-19-7, biological studies 66-25-1, Hexanal 67-64-1, Acetone, biological studies 67-68-5, DMSO, biological studies 67-71-0, Dimethyl sulfone 71-23-8, 1-Propanol, biological studies 71-41-0, 1-Pentanol, biological studies 71-43-2, Benzene, biological studies 71-43-2D, Benzene, alkyl derivs. 74-93-1, Methanethiol, biological studies 75-07-0, Acetaldehyde, biological studies 75-15-0, Carbon disulfide, biological studies 75-28-5 75-50-3, Trimethylamine, biological studies 76-22-2, Camphor 78-78-4 78-84-2, Methylpropanal 78-93-3, Butanone, biological studies 79-09-4, Propionic acid, biological studies 91-20-3, biological studies 95-13-6 95-16-9, Benzothiazole 96-14-0, 3-Methylpentane 96-17-3, 2-Methylbutanal 96-37-7, Methylcyclopentane 96-48-0, 4-Butanolide 98-00-0, Furfuryl

alcohol 98-01-1, Furfural, biological studies 98-86-2,
biological studies 100-41-4, Ethylbenzene, biological studies
100-42-5, biological studies 100-51-6, biological studies
100-52-7, Benzaldehyde, biological studies 100-71-0,
2-Ethylpyridine 101-41-7 103-65-1, Propylbenzene 104-50-7,
.gamma.-Octalactone 106-70-7 106-73-0, Methyl heptanoate
106-97-8, Butane, biological studies 107-83-5, 2-Methylpentane
107-87-9, 2-Pentanone 107-92-6, biological studies 108-10-1,
4-Methyl-2-pentanone 108-50-9, 2,6-Dimethylpyrazine 108-87-2,
Methylcyclohexane 108-88-3, biological studies 108-90-7,
Chlorobenzene, biological studies 108-94-1, Cyclohexanone,
biological studies 108-95-2, biological studies 109-08-0,
Methylpyrazine 109-52-4, Pentanoic acid, biological studies
109-66-0, Pentane, biological studies 109-92-2, Ethyl vinyl ether
109-97-7, Pyrrole 110-02-1 110-12-3, 5-Methyl-2-hexanone
110-42-9, Methyl decanoate 110-43-0, 2-Heptanone 110-54-3,
Hexane, biological studies 110-62-3, Pentanal 110-80-5
110-82-7, Cyclohexane, biological studies 110-82-7D, Cyclohexane,
alkyl derivs. 110-86-1, Pyridine, biological studies 111-11-5,
Methyl octanoate 111-13-7, 2-Octanone 111-27-3, 1-Hexanol,
biological studies 111-65-9, Octane, biological studies
111-70-6, 1-Heptanol 111-71-7, Heptanal 111-84-2, Nonane
111-87-5, 1-Octanol, biological studies 112-12-9, 2-Undecanone
112-31-2 112-40-3, Dodecane 112-41-4, Dodec-1-ene 115-11-7,
biological studies 116-09-6, Hydroxypropanone 120-92-3,
Cyclopentanone 123-32-0, 2,5-Dimethylpyrazine 123-54-6,
2,4-Pentanedione, biological studies 124-13-0, Octanal 124-18-5,
Decane 124-19-6, Nonanal 124-38-9, Carbon dioxide, biological
studies 138-86-3, Limonene 141-78-6, Ethyl acetate, biological
studies 142-82-5, biological studies 288-47-1, Thiazole
290-37-9, Pyrazine 290-37-9D, Pyrazine, alkyl derivs. 431-03-8,
Diacetyl 463-58-1, Carbonyl sulfide 504-60-9, Penta-1,3-diene
505-57-7, 2-Hexenal 513-86-0, Acetoin 534-22-5, 2-Methylfuran
536-78-7, 3-Ethylpyridine 554-12-1, Methylpropionate 554-14-3,
2-Methylthiophene 565-61-7, 3-Methyl-2-pentanone 589-38-8,
3-Hexanone 590-86-3, 3-Methylbutanal 591-78-6, 2-Hexanone
592-27-8, 2-Methylheptane 600-14-6 600-22-6, Methyl pyruvate
620-02-0, 5-Methylfurfural 623-36-9, 2-Methyl-2-pentenal
623-42-7, Methylbutyrate 624-24-8, Methylvalerate 624-92-0,
Methyl disulfide 625-33-2 628-29-5, Butyl methyl sulfide
629-50-5, Tridecane 636-41-9, 2-Methylpyrrole 693-54-9,
2-Decanone 693-95-8, 4-Methylthiazole 821-55-6, 2-Nonanone
929-20-4, 1,3,6-Octatriene 932-16-1, 2-Acetyl-1-methylpyrrole
1072-83-9, 2-Acetylpyrrole 1115-11-3, 2-Methyl-2-butenal
1120-21-4, Undecane 1120-72-5, 2-Methylcyclopentanone 1120-73-6,
2-Methylcyclopent-2-enone 1122-62-9, 2-Acetylpyridine 1124-11-4,
Tetramethylpyrazine 1319-73-9, Methylstyrene 1330-20-7, Xylene,
biological studies 1333-41-1, Methylpyridine 1335-39-3, Hexenal
1618-26-4 1629-58-9, 1-Penten-3-one 1678-92-8,
Propylcyclohexane 1679-49-8 1731-84-6, Methyl nonanoate
1757-42-2 2039-90-9, 2,6-Dimethylstyrene 2040-95-1,
Butylcyclopentane 2346-00-1, 2-Methyl-2-thiazoline 2758-18-1,

3-Methylcyclopent-2-enone 2847-72-5, 4-Methyldecane 3188-00-9,
 2-Methyltetrahydrofuran-3-one 3268-49-3, Methional 3391-86-4,
 Oct-1-en-3-ol 3581-87-1, 2-Methylthiazole 3581-89-3,
 5-Methylthiazole 3658-80-8, Dimethyltrisulfide 3777-69-3,
 2-Pentylfuran 3877-15-4, Methyl propyl sulfide 4170-30-3
 4177-16-6, Vinylpyrazine 4229-91-8, 2-Propylfuran 5910-85-0,
 2,4-Heptadienal 5910-89-4, 2,3-Dimethylpyrazine 5911-04-6,
 3-Methylnonane 7446-09-5, Sulfur dioxide, biological studies
 7783-06-4, Hydrogen sulfide, biological studies 13360-64-0,
 2-Ethyl-5-methylpyrazine 13360-65-1, 2,5-Dimethyl-3-ethylpyrazine
 13925-00-3, Ethylpyrazine 13925-03-6, 2-Ethyl-6-methylpyrazine
 13925-08-1, 2-Methyl-5-vinylpyrazine 13925-09-2,
 2-Methyl-6-vinylpyrazine 14667-55-1, Trimethylpyrazine
 15707-23-0, 2-Ethyl-3-methylpyrazine 17398-16-2,
 2-Ethyl-3,5,6-trimethylpyrazine 18138-04-0 18138-05-1,
 2,6-Diethyl-3-methylpyrazine 18707-60-3, Methyl 2-butenate
 20548-00-9 20662-84-4, 2,4,5-Trimethyloxazole 20825-71-2
 23747-47-9, 6,7-Dihydro(5H)cyclopentapyrazine 23747-48-0
 24295-03-2, 2-Acetylthiazole 25321-22-6, Dichlorobenzene
 25321-29-3 25377-83-7, Octene 25551-13-7, Trimethylbenzene
 25619-60-7, Tetramethylbenzene 27175-64-0, Dimethylpyridine
 27417-39-6, Methylpyrrole 27987-10-6 29036-25-7, Methylindene
 29926-41-8, 2-Acetyl-2-thiazoline 32736-91-7, 2,5-Diethyl-3-
 methylpyrazine 34314-83-5, 4-Methyl-2,3-dihydrofuran 50888-63-6
 53563-67-0, Dimethylindan 62488-56-6, Nona-2,4-dienol
 63012-97-5, 2-Methyl-3-(methylthio)furan 82000-05-3 99530-41-3
 108338-91-6 108392-63-8

(of cooked **beef aroma**, water activity effect
 on)

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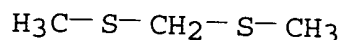
106:66004 Capillary gas chromatography-mass spectrometric analysis of
 cooked ground **beef aroma**. MacLeod, Glesni;
 Ames, Jennifer M. (Dep. Food Nutr. Sci., King's Coll. London,
 London, W8 7AH, UK). Journal of Food Science, 51(6), 1427-34
 (English) 1986. CODEN: JFDSA. ISSN: 0022-1147.

AB Representative samples of cooked ground **beef aroma**
 were isolated onto Tenax TA. Fractionation using capillary gas
 chromatog. (GC) showed that a cooked **meaty odor**
 was assocd. with only four **aroma** fractions. These
 contained relatively high boiling components, and 31 locations on
 the gas chromatogram were anchored by **meaty** descriptions
 using GC odor port assessment. Several of the components
 identified by GC-mass spectrometry have not been reported previously
 from heated **beef**. They comprise some compds. contributing
meaty character e.g. 2-methyl-3-(methylthio)furan
 [63012-97-5] and 3-methylcyclopentanone [1757-42-2]. Several
 unsatd. alicyclic ketones present resemble the cyclohexenones
 previously shown to be significant in **meaty aroma**

IT 1618-26-4, Bis(methylthio)methane
 (of **beef aroma**, after cooking)

RN 1618-26-4 HCA

CN Methane, bis(methylthio)- (6CI, 7CI, 8CI, 9CI) (CA INDEX NAME)



CC 17-7 (Food and Feed Chemistry)

ST cooked **beef** volatile substance; **odor** compd
cooked **beef**IT **Odor** and **Odorous** substances

Volatile substances

Alcohols, biological studies

Aldehydes, biological studies

Hydrocarbons, biological studies

Ketones, biological studies

(of ground **beef**, after cooking)IT **Meat**

(beef, cooked ground, volatile substances of)

IT 60-29-7, Diethyl ether, biological studies 64-17-5, Ethanol, biological studies 64-19-7, biological studies 66-25-1, Hexanal 67-64-1, Acetone, biological studies 67-71-0, Dimethyl sulfone 71-23-8, Propan-1-ol, biological studies 71-41-0, Pentan-1-ol, biological studies 71-43-2, Benzene, biological studies 74-93-1, Methanethiol, biological studies 75-07-0, biological studies 75-15-0, Carbon disulfide, biological studies 75-28-5 75-50-3, Trimethylamine, biological studies 76-22-2, Camphor 78-78-4 78-84-2 78-93-3, Butanone, biological studies 79-09-4, Propanoic acid, biological studies 91-20-3, biological studies 95-13-6 96-14-0, 3-Methylpentane 96-17-3, 2-Methylbutanal 96-37-7, Methylcyclopentane 96-48-0, 4-Hydroxybutanoic acid lactone 98-00-0, 2-Furanmethanol 98-01-1, 2-Furancarboxaldehyde, biological studies 98-86-2, Acetophenone, biological studies 100-41-4, Ethylbenzene, biological studies 100-42-5, biological studies 100-52-7, Benzaldehyde, biological studies 100-71-0, 2-Ethylpyridine 101-41-7, Methyl phenylacetate 103-65-1, Propylbenzene 104-50-7, 4-Hydroxyoctanoic acid lactone 106-70-7, Methyl hexanoate 106-97-8, Butane, biological studies 107-83-5, 2-Methylpentane 107-87-9, Pentan-2-one 107-92-6, biological studies 108-10-1, 4-Methylpentan-2-one 108-88-3, biological studies 108-90-7, Chlorobenzene, biological studies 108-94-1, Cyclohexanone, biological studies 108-95-2, biological studies 109-08-0, Methylpyrazine 109-52-4, Pentanoic acid, biological studies 109-92-2, Ethyl vinyl ether 109-97-7, Pyrrole 110-02-1 110-12-3, 5-Methylhexan-2-one 110-43-0, Heptan-2-one 110-54-3, Hexane, biological studies 110-62-3, Pentanal 110-80-5, 2-Ethoxyethanol 110-82-7, Cyclohexane, biological studies 110-86-1, Pyridine, biological studies 110-86-1D, derivs. 111-13-7, Octan-2-one 111-27-3, Hexan-1-ol, biological studies 111-65-9, Octane, biological studies 111-70-6, Heptan-1-ol 111-71-7, Heptanal 111-84-2, Nonane 111-87-5, Octan-1-ol, biological studies 112-12-9, Undecan-2-one 112-31-2, Decanal 112-40-3, Dodecane 112-41-4, Dodec-1-ene 115-11-7, biological

studies 116-09-6, Hydroxypropanone 120-92-3, Cyclopentanone
 123-54-6, Pentane-2,4-dione, biological studies 124-13-0, Octanal
 124-18-5, Decane 124-19-6, Nonanal 124-38-9, Carbon dioxide,
 biological studies 138-86-3, Limonene 141-78-6, Ethyl acetate,
 biological studies 142-82-5, biological studies 288-47-1,
 Thiazole 290-37-9, Pyrazine 290-37-9D, derivs. 431-03-8,
 Butanedione 463-58-1, Carbonyl sulfide 504-60-9, Penta-1,3-diene
 513-86-0 534-22-5, 2-Methylfuran 536-78-7, 3-Ethylpyridine
 554-12-1, Methyl propanoate 554-14-3 565-61-7,
 3-Methylpentan-2-one 589-38-8, Hexan-3-one 590-86-3,
 3-Methylbutanal 591-78-6, Hexan-2-one 592-27-8, 2-Methylheptane
 600-14-6, Pentane-2,3-dione 623-36-9, 2-Methylpent-2-enal
 624-92-0, Dimethyl disulfide 625-33-2, Pent-3-en-2-one 629-50-5
 636-41-9, 2-Methylpyrrole 693-54-9, Decan-2-one 821-55-6,
 Nonan-2-one 929-20-4, 1,3,6-Octatriene 932-16-1,
 2-Acetyl-1-methylpyrrole 1072-83-9, 2-Acetylpyrrole 1115-11-3,
 2-Methylbut-2-enal 1120-21-4, Undecane 1120-72-5,
 2-Methylcyclopentanone 1120-73-6, 2-Methylcyclopent-2-enone
 1122-62-9, 2-Acetylpyridine 1124-11-4, Tetramethylpyrazine
1618-26-4, Bis(methylthio)methane 1629-58-9,
 Pent-1-en-3-one 2039-90-9, 2,6-Dimethylstyrene 2040-95-1,
 Butylcyclopentane 2346-00-1, 2-Methyl-2-thiazoline 3188-00-9,
 2-Methyltetrahydrofuran-3-one 3391-86-4, Oct-1-en-3-ol
 3658-80-8, Dimethyltrisulfide 3777-69-3, 2-Pentylfuran
 3877-15-4, Methyl propyl sulfide 4170-30-3 4177-16-6,
 Vinylpyrazine 4229-91-8, 2-Propylfuran 5910-85-0,
 Hepta-2,4-dienal 5910-89-4, 2,3-Dimethylpyrazine 7446-09-5,
 Sulfur dioxide, biological studies 7732-18-5, Water, biological
 studies 7783-06-4, Hydrogen sulfide, biological studies
 13360-65-1, 2,5-Dimethyl-3-ethylpyrazine 13925-00-3, Ethylpyrazine
 14667-55-1, Trimethylpyrazine 15707-23-0, 2-Ethyl-3-methylpyrazine
 17398-16-2, 2-Ethyl-3,5,6-trimethylpyrazine 18138-04-0,
 2,3-Diethyl-5-methylpyrazine 18138-05-1, 2,6-Diethyl-3-
 methylpyrazine 20548-00-9 20662-84-4, 2,4,5-Trimethyloxazole
 23747-47-9, 6,7-Dihydro-(5H)-cyclopentapyrazine 23747-48-0
 24295-03-2, 2-Acetylthiazole 29926-41-8, 2-Acetyl-2-thiazoline
 32736-91-7, 2,5-Diethyl-3-methylpyrazine 34314-83-5,
 4-Methyl-2,3-dihydrofuran 50888-63-6, 2-Butyl-3,5-dimethylpyrazine
 106566-90-9

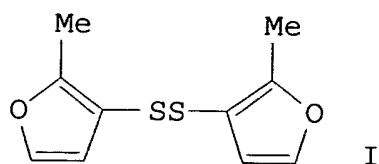
(of **beef** aroma, after cooking)

IT 1757-42-2, 3-Methylcyclopentanone 63012-97-5, 2-Methyl-3-
 (methylthio)furan
 (of ground **beef**, after cooking)

L59 ANSWER 22 OF 28 HCA COPYRIGHT 2003 ACS

100:33389 Volatile sulfur-containing compounds in simulated **meat**
flavor and comparison of their composition with volatile
 compounds of natural boiled **beef**. Golovnya, R. V.;
 Misharina, T. A.; Garbuzov, V. G.; Medvedev, F. A. (Inst. Org.
 Compd., Moscow, USSR). Prikladnaya Biokhimiya i Mikrobiologiya,
 19(5), 681-91 (Russian) 1983. CODEN: PBMIK. ISSN: 0555-1099.

GI



AB The compn. of S-contg. compds. of the simulated **meat flavor** obtained by Maillard reaction from baker's yeast autolyzate was studied. Gas chromatog. anal. on 4 columns with different polarity identified 37 compds., and the structure of 13 compds. was confirmed by mass spectrometry. Nine S-contg. compds. had not been previously reported for model systems or for natural **meat** products. Two from 4 gas chromatog. fractions possessed cooked **meat aroma** corresponding to boiled **beef**. All these fractions were characterized by retention indexes and **odor** description. The compd. that contributed most to the **meat flavor** of some of these fractions was bis(2-methyl-3-furyl)disulfide (I) [28588-75-2] which alone at a high diln. had an **odor** resembling that of roast **chicken**. Twenty-five of the identified S-contg. compds. were also inherent in various **meat** products.

IT 4396-19-4

(of **meat flavor** additive, from yeast autolyzate)

RN 4396-19-4 HCA

CN Ethane, 1,1'-[methylenebis(thio)]bis- (9CI) (CA INDEX NAME)

EtS-CH₂-SEt

CC 17-6 (Food and Feed Chemistry)

ST **beef flavor** additive compn; **meat flavor** additive compn; sulfur compd **meat flavor** additive

IT Maillard reaction
(in **meat** simulated **flavor** manuf., from yeast autolyzate)

IT Yeast
(**meat** simulated **flavor** from autolyzate of, components of)

IT **Flavoring** materials
(**meat**, from yeast autolyzate, components of)

IT **Flavoring** materials
(**meat**, from yeast autolyzate, compn. of)

IT 98-02-2 98-03-3 110-02-1 110-81-6 505-20-4 554-14-3
625-80-9 1518-72-5 1613-45-2 2179-60-4 4396-19-4
4829-04-3 4911-45-9 5616-51-3 5834-16-2 6007-23-4
6258-63-5 6263-62-3 7282-08-8 13129-38-9 20333-39-5

20731-74-2 28588-75-2 30453-31-7 31331-53-0 39709-34-7
40136-66-1 40228-18-0 50363-43-4 72033-36-4 72437-67-3

(of **meat flavor** additive, from yeast autolyzate)

IT 74-93-1, biological studies 75-08-1 107-03-9 513-44-0
624-92-0 7783-06-4, biological studies
(of **meat flavor** from yeast autolyzate)

L59 ANSWER 23 OF 28 HCA COPYRIGHT 2003 ACS

99:4241 Volatile sulfur-containing compounds in simulated **meat flavor** and their comparison with the constituents of natural **aroma**. Golovnya, R. V.; Misharina, T. A.; Garbuzov, V. G.; Medvedyev, F. A. (Nesmeyanov' Inst. Organo-Element Compd., Moscow, USSR). Nahrung, 27(3), 237-49 (English) 1983. CODEN: NAHRAR. ISSN: 0027-769X.

AB The compn. of S-contg. compds. was detd. in simulated **meat flavor** compns. for use in food industry and obtained via the Maillard reaction from bakery yeast autolysis. Gas chromatog. anal. on a series of 4 columns of different polarity identified 37 compds., and the structures of 13 of them were confirmed by mass spectrometry. Nine S substances were not reported previously either for model systems or natural **meat** products. Two gas-chromatog. fractions had a cooked **meat aroma** similar to boiled **beef**. All fractions were characterized by retention indexes and **odor** description. Twenty-five of the S compds. occurred naturally in various **meat** products.

IT 4396-19-4
(of **meat flavoring** compn.)

RN 4396-19-4 HCA

CN Ethane, 1,1'-[methylenebis(thio)]bis- (9CI) (CA INDEX NAME)

EtS-CH₂-SEt

CC 17-6 (Food and Feed Chemistry)

ST **meat flavoring** volatile sulfur compd

IT **Meat**

(sulfur-contg. volatiles in, artificial **meat flavoring** in relation to)

IT Volatile substances

(sulfur-contg., of artificial **meat flavoring**)

IT **Flavoring** materials

(**meat**, sulfur-contg., compn. of)

IT 74-93-1, biological studies 98-02-2 98-03-3 107-03-9
110-02-1 110-81-6 505-20-4 513-44-0 554-14-3 624-92-0
625-80-9 1438-91-1 1468-83-3 1518-72-5 1613-45-2 2179-60-4
4396-19-4 4829-04-3 5616-51-3 5834-16-2 6007-23-4
6258-63-5 6263-62-3 6496-97-5 7282-08-8 7783-06-4,
biological studies 20333-39-5 20731-74-2 28588-75-2
30453-31-7 31331-53-0 40136-66-1 40228-18-0 50363-43-4
72033-36-4 85985-70-2

(of **meat flavoring** compn.)

L59 ANSWER 25 OF 28 HCA COPYRIGHT 2003 ACS

93:112390 Sulfur containing compounds in the volatile constituents of boiled **meat**. Golovnja, R. V.; Rothe, M. (Inst. Org. Element Compd., Moscow, USSR). Nahrung, 24(2), 141-54 (English) 1980. CODEN: NAHRAR. ISSN: 0027-769X.

AB S-contg. compds were isolated from the volatiles of boiled **beef** by pptn. with HgCl₂ and regenerated volatile compds. were identified by gas chromatog. retention time index comparisons on glass columns contg. Apiezon-M, OV-17, Triton X-305, PEG-1000, or Porapak R (for low-boiling compds.) and with flame-ionization and flame-photometric detectors. Most of the peaks detected had identical index values in the 3 samples used. Comparisons of the **beef flavor** volatiles showed large differences from the volatiles formed by Maillard reaction products. Of 21 S-contg. compds. in the Maillard reaction products, only 10 were found in the boiled **meat**, and the boiled **meat** had 22 S-contg. compds. not found in the Maillard reaction products: for the 1st time bisulfides, a tetrasulfide, and methyl octyl sulfide [3698-95-1] and methyl nonyl sulfide [59973-07-8] and the corresponding octyl [111-88-6] and nonyl mercaptans [1455-21-6] were identified. The compn. of S-contg. compds. in **meat flavor** is discussed.

IT 1618-26-4
(detn. of, in **beef** boiled **flavor**,
gas-chromatog.)

RN 1618-26-4 HCA

CN Methane, bis(methylthio)- (6CI, 7CI, 8CI, 9CI) (CA INDEX NAME)



CC 17-1 (Foods)

ST **meat flavor** sulfur compd; **beef**
volatile **flavor** detn; gas chromatog **beef**
flavor; odor boiled **beef**

IT Odor and Odorous substances

(**beef** boiled, sulfur-contg. volatile compds. in)

IT Volatile substances

(detn. of sulfur-contg., in **beef** boiled **flavor**
, gas-chromatog.)

IT Maillard reaction

(products of, **beef** boiled **flavor** in relation
to)

IT **Meat**

(**beef**, boiled, sulfur-contg. volatile constituents
detn. in, gas-chromatog.)

IT 74-93-1, analysis 75-08-1 75-15-0, analysis 88-15-3 98-03-3

110-02-1 110-81-6 420-12-2 554-14-3 1618-26-4

3658-80-8 7783-06-4, analysis 20333-39-5 23654-92-4

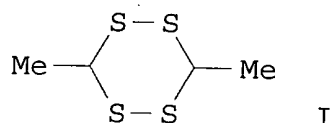
31331-53-0

(detn. of, in **beef** boiled **flavor**,

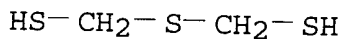
- gas-chromatog.)
- IT 75-18-3 928-47-2 5395-75-5 5865-15-6 6008-80-6 14272-25-4
 22037-97-4 26733-25-5 54410-63-8 74674-90-1
 (from Maillard model reaction, boiled **beef**
flavor in relation to)
- IT 75-66-1 110-06-5 111-88-6 290-79-9 624-92-0 625-80-9
 766-92-7 1455-21-6 2179-60-4 3600-24-6 3698-95-1 5756-24-1
 31499-71-5 40136-65-0 51288-07-4 59094-77-8 59973-07-8
 (of **beef** boiled **flavor**)

L59 ANSWER 26 OF 28 HCA COPYRIGHT 2003 ACS
 90:136372 Nonacidic constituents of volatiles from cooked mutton.
 Nixon, Leon N.; Wong, Edmon; Johnson, Cecil B.; Birch, Edward J.
 (Appl. Biochem. Div., DSIR, Palmerston North, N. Z.). Journal of
 Agricultural and Food Chemistry, 27(2), 355-9 (English) 1979.
 CODEN: JAFCAU. ISSN: 0021-8561.

GI



- AB The nonacidic volatiles from cooking mutton were analyzed by gas chromatog.-mass spectrometry, both as Et2O exts. and by adsorption onto porous polymer traps. Of the 93 compds. identified (some tentatively), 56 have not previously been reported in volatiles from cooked ovine tissues and 15, including the new compd. 3,6-dimethyl-1,2,4,5-tetrathiane (I) [67411-27-2], have not been previously identified in cooked **meats**.
- IT 7529-06-8
 (of **aroma**, of cooking mutton)
- RN 7529-06-8 HCA
 CN Methanethiol, thiobis- (9CI) (CA INDEX NAME)



- CC 17-3 (Foods)
 ST volatile cooked mutton; **meat aroma** cooking;
 tetrathiane **aroma meat**
- IT **Odor** and **Odorous** substances
 Volatile substances
 (of cooking mutton)
- IT **Meat**
 (mutton, volatile substances of cooking)
- IT 64-17-5, biological studies 67-56-1, biological studies 67-63-0,
 biological studies 71-23-8, biological studies 71-36-3,
 biological studies 71-41-0, biological studies 75-18-3

75-50-3, biological studies 78-84-2 96-17-3 98-01-1,
 biological studies 98-03-3 100-52-7, biological studies
 106-70-7 108-95-2, biological studies 110-00-9 111-06-8
 122-78-1 123-95-5 124-06-1 142-83-6 292-46-6 420-12-2
 534-22-5 585-25-1 589-35-5 590-86-3 616-25-1 620-02-0
 624-92-0 628-97-7 638-17-5 730-46-1 1192-62-7 1319-77-3
 1321-94-4 3391-86-4 4170-30-3 5577-44-6 6750-03-4
 7529-06-8 7664-41-7, biological studies 13162-46-4
 14237-73-1 25154-40-9 37160-77-3 53897-59-9 69382-63-4
 69382-64-5

(of **aroma**, of cooking mutton)

IT 23654-92-4P 67411-27-2P 69382-62-3P
 (prepn. and identification of, in **aroma** of cooking
 mutton)

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FILE 'HCA' ENTERED AT 14:20:01 ON 27 JUN 2003

L60 150 S L44 AND L12
 L61 246710 S HYDROGENA?
 L62 1 S L60 AND L61

=> d l62 1 cbib abs hitstr hitind

L62 ANSWER 1 OF 1 HCA COPYRIGHT 2003 ACS
 134:279946 Savoury flavour comprising 2-methyl-furan -3-thiol and/or a
 derivative and methylenedithiol and/or a derivative. Fitz,
 Wolfgang; Van Delft, Andries; Kerler, Josef; Hesp, Theodorus Gerardus
 Maria; Apeldoorn, Willem; Altena, Gerrit Hendrik (Quest
 International B.V., Neth.). Eur. Pat. Appl. EP 1090557 A1 20010411,
 14 pp. DESIGNATED STATES: R: AT, BE, CH, DE, DK, ES, FR, GB, GR,
 IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO. (English).
 CODEN: EPXXDW. APPLICATION: EP 1999-203197 19990930.
 AB A food flavoring material comprises (**hydrogenated**)
 2-methylfuran-3-thiol and methanedithiol and/or their derivs. The
 combination of the above compds. leads to strong food flavor
 reminiscent of **beef** broth.
 IT 6725-64-0P, Methanedithiol
 (savory flavor comprising 2-methylfuran -3-thiol and
 methylenedithiol and/or derivs.)
 RN 6725-64-0 HCA
 CN Methanedithiol (6CI, 7CI, 8CI, 9CI) (CA INDEX NAME)

HS-CH₂-SH

IT 2506-35-6P, Methanedithiol diacetate 29414-47-9P,
 Methylthiomethanethiol 38634-59-2P
 (savory flavor comprising 2-methylfuran -3-thiol and

methylenedithiol and/or derivs.)

RN 2506-35-6 HCA

CN Ethanethioic acid, S,S'-methylene ester (9CI) (CA INDEX NAME)

AcS-CH₂-SAC

RN 29414-47-9 HCA

CN Methanethiol, (methylthio)- (6CI, 7CI, 8CI, 9CI) (CA INDEX NAME)

HS-CH₂-S-CH₃

RN 38634-59-2 HCA

CN Ethanethioic acid, S-[(methylthio)methyl] ester (9CI) (CA INDEX NAME)

AcS-CH₂-SMe

IT 85544-38-3P 333384-99-9P

(savory flavor comprising 2-methylfuran -3-thiol and methylenedithiol and/or derivs.)

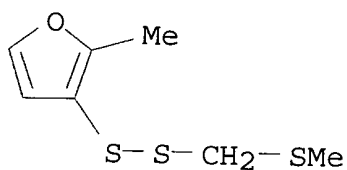
RN 85544-38-3 HCA

CN Disulfide, bis[(methylthio)methyl] (9CI) (CA INDEX NAME)

MeS-CH₂-S-S-CH₂-SMe

RN 333384-99-9 HCA

CN Furan, 2-methyl-3-[[[(methylthio)methyl]dithio]- (9CI) (CA INDEX NAME)



IC ICM A23L001-226

ICS C07C319-02

CC 17-6 (Food and Feed Chemistry)

IT 6725-64-0P, Methanedithiol 28588-74-1P,
2-Methylfuran-3-thiol

(savory flavor comprising 2-methylfuran -3-thiol and methylenedithiol and/or derivs.)

IT 2506-35-6P, Methanedithiol diacetate 29414-47-9P,
Methylthiomethanethiol 38634-59-2P

(savory flavor comprising 2-methylfuran -3-thiol and methylenedithiol and/or derivs.)

IT 28588-75-2P 85544-38-3P 333384-99-9P

(savory flavor comprising 2-methylfuran -3-thiol and methylenedithiol and/or derivs.)